

\*

**YEAR 1, ANNUAL REPORT (FY 1998)**

Submission date 12 November 1998

*FOREST GARDEN PROGRAM  
through TOTAL ECOSYSTEM MANAGEMENT for SRI LANKA  
and the PHILIPPINES*

**Abstract** (1) *The Forest Garden Program through Total Ecosystem Management* is a Matching Grant for Sri Lanka and the Philippines. The cooperative agreement (# FAO-A-00-97-00048-00), was signed on 24 September 1997, by *Counterpart International* and USAID BHR/PVC. The program has an effective life of five years with an end of project of 23 September 2002. (2) The overall goal of the program is to **improve the quality of life of the people living in rural communities of Sri Lanka and the Philippines, while restoring the native biodiversity of these rural environments**. Employing Total Ecosystem Management techniques, the Forest Garden initiative seeks to: a) Promote broad-scale development of organic gardening systems that are site-stable, tree dominated, and species rich in valuable perennial crops; b) Improve farmer income; c) Foster improved management of water resources and landscapes; and, d) Locally restore native biodiversity in rural lands in Sri Lanka and the Philippines. In so doing, the Forest Garden Program constitutes an integrated, multisectoral approach to sustainable development. (3) Our *Detailed Implementation Plan* was submitted 31 March 1998 and revised on 15 July 1998. This Annual Report assesses the extent to which Counterpart International and its partners have achieved progress toward stated objectives, sustainability, status of the strategic partnership, and lessons learned for the FY 1998. This constitutes the first of five annual reports.

**Counterpart International**

Division of Environment and Natural Resources  
1200 18<sup>th</sup> St, NW, Suite 1100  
Washington, D C 20036  
Tel 202-296-9676 Fax 202-296-9679

**Contact**

Bruce M Beehler  
Director, Division of Environment and Natural Resources  
email [bbeehler@counterpart.org](mailto:bbeehler@counterpart.org)

\*

## Table of Contents

<b>SRI LANKA</b>	<b>2</b>
Overview of Year One and Changes Subsequent to DIP	2
Constraints, Unexpected Benefits and Lessons Learned	4
Changes in Project Design	5
<b>PHILIPPINES</b>	<b>6</b>
Overview of Year One and Changes Subsequent to DIP	6
Constraints, Unexpected Benefits and Lessons Learned	7
Changes in Project Design	10
<b>REGIONAL</b>	<b>10</b>
Overview of Year One and Changes Subsequent to DIP	10
Constraints, Unexpected Benefits and Lessons Learned	11
Changes in Project Design	12
<b>HEADQUARTERS</b>	<b>12</b>
Overview of Year One and Changes Subsequent to DIP	12
Constraints, Unexpected Benefits and Lessons Learned	14
Changes in Project Design	14
<b>STRATEGIC QUESTIONS</b>	<b>14</b>
<b>DIP TIME LINE/ SCHEDULE OF ACTIVITIES, Progress as of October 1, 1998 (TABLE 1)</b>	<b>16</b>
Table 1a, Sri Lanka Program	16
Table 1b, Philippines Program	17
Table 1c, Regional Program	18
Table 1d, Headquarters	19
<b>DIP GOALS AND OBJECTIVES, Progress as of October 1, 1998 (TABLE 2)</b>	<b>20</b>
Table 2a, Sri Lanka Program	20
Table 2b, Philippines Program	22
Table 2c, Headquarters and Regional Program	26
<b>ATTACHMENTS 1-5</b>	
Attachment 1 Sri Lanka Annual Report	
Attachment 2 Philippines Annual Report	-
Attachment 3 Regional Annual Report	
Attachment 4 Seminar/Workshop Notes on Forest Gardens and Analog Forestry	
Attachment 5 FGP Standards and Procedures Manual	

Already established from prior extension work in a number of “veteran” communities, the Forest Garden initiative is currently being promoted in 12 new communities in Sri Lanka, covering 5 eco-zones

- Montane zone Walapane and Nuwara Eliya areas
- Intermediate zone Nikapotha and Karandagolla areas
- Wet zone Haldolla and Bopath-ella areas
- Dry and Intermediate zone Moneragala and Mahiyangana areas
- Wet zone mangroves and reef
  - i mangrove Panadura Island and Bolgoda village
  - ii reef ecosystem Buona Vista and Weggal Modara

The task of promoting Forest Gardens within the 5 eco-zones has within this first year alone entailed extensive relationship-building with host communities and individual farmers. Since program inception, Forest Gardens have on the whole been met by positive local level response (note constraints below)

Even as the substructure was strengthened, additional program components were set in motion. Baseline sociological and income surveys, ecological surveys and resource mapping for landscape design, and the identification of markets and species for Forest Garden Products provide additional measures of initial accomplishments and a definitive contribution to the long-range plan.

Within each of these communities, NSRC designed and oversaw the compilation of extensive baseline land and community resource surveys. Crucial to evaluating the programmatic efforts and the objective of biodiversity increases, they have also conducted baseline surveys of indicator species for each of the five implementation sites. Having created resource maps, they set about defining and implementing with individual farmers a site-specific planting regimen—one that most appropriately and efficiently meets both program goals and farmer expectations.

A Nursery is central to start-up activities to most Forest Garden programs and, in the long-run, serve as a cost-recovery mechanism. NSRC expanded the central Nursery this year to supply the needed seeds and seedlings for the expanding program. The central nursery alone has propagated over 90,000 saplings and seedlings this year. Additional nurseries have been established in Bolgoda, Badalkumbura, Moneragala and Ratnapura district and at Haldola and Kaduruuwa temples.

To support the concept of value-added “Forest Garden Products,” NSRC has developed an “FGP” certification system. 85 Forest gardens are currently certified in Sri Lanka. Forest Garden Product certification is a statement of method and a record that establishes a clear audit trail—wherein claims made by the producer or certification officer may be verified by a third party (see **Attachment 5** FGP standards and Procedures Manual). Specifically, Forest Garden Product certification ensures that products are (1) produced following internationally recognized organic standards, and, (2) that Forest Garden implementation and maintenance benefit local biodiversity, agricultural sustainability,

and environmental stability. These points affirm both a scientific basis for the certification system and underline the importance that organic management has on the quality of a Forest Garden Product. Certification will ensure the buyer that the fundamental goals and specific performance indicators of the Forest Garden natural resource plan are, indeed, being achieved.

NSRC has attended a variety of international conferences in order to gain experience with certification and other issues related to organic and biodiversity-friendly production. Implementation sites have developed official relationships with the Departments of Forestry and Environment as well as the Department of Export and Divisional Secretaries in their districts. These are good indications that the Sri Lanka component of Forest Gardens is expanding its business management and marketing capacity.

#### Conferences and Workshops attended by NSRC

- February 1998: A Conference to discuss the Impact of Intellectual Property Rights (IPR) regimes on Ayurvedic & Indigenous knowledge systems of Sri Lanka (Colombo)
- March 1998: National Farmer Meeting NYSC (Maharagama, Sri Lanka)
- June 1998: International Analog Forestry Meeting (Lima, Peru)
- June 1998: Conservation of Bio-diversity in Agriculture (Japan)
- July 1998: The Analog Forestry Data base/CISIR, Discussion with Mr. John Jack of Monash University, Australia (Colombo)

#### Farmer income and marketing—

In Haldola and Bopatta villages, average monthly income was Rs 3000 per month before the project started. With the introduction of income generation activities such as vegetable cultivation, seed collecting programs, ginger and turmeric cultivation and plant nursery development, the average monthly income of the two villages has increased to Rs 3500.

Village produced Forest Garden Products are being purchased by an organic products exporter, Lanka Organics, which pays premium prices for export-quality certified products. At this time villagers are selling black pepper, tea, cardamom, and kithul syrup to Lanka Organics. Lanka Organics is working closely with NSRC to foster the development of significant decentralized production regimes of Forest Garden products. Exports for Lanka Organics are growing at about 20% per annum. A goal of NSRC is to foster these sorts of productive linkages that provide heightened incomes of farmers and improved supply streams to organic marketers and exporters.

The Uva Nursery is the commercial arm of the NSRC which has been cultivating and marketing Forest Garden Products in the local Colombo markets for the past six years. The Uva Nursery earned more than Rs 800,000 in the past year from the sales of Forest Garden Products.

## II Constraints, Unexpected Benefits and Lessons Learned

The first year of the Sri Lanka initiative has been good, but not without its challenges. From the standpoint of the Counterpart Headquarters, NSRC needed additional

management capacity and a stable and permanent Colombo-based headquarters. This was indicated to NSRC in a trip by Bruce Beehler to Sri Lanka in January 1997, and NSRC has now taken steps to address the situation. NSRC was founded by a group of very dedicated volunteers, who often carried out their work without compensation. This tradition has continued, but Counterpart is encouraging a transition to a more formal administration that accounts for the requirements of international funding agencies. This is especially important with regard to USAID financial reporting as well as match fund-raising. In this regard, NSRC's volunteer Director, Ms. Kamal Melvani, has agreed to come on as a paid full-time Director starting 1 October 1998. This is a critical step forward to the development of NSRC's full capacity and its ability to carry out its mission. We should note here that the work of NSRC has consistently been excellent.

Another impact of the volunteer-spirit has been the tendency to attempt to implement too many field activities with too few staff and support funds. Current operations may be challenged by this phenomenon, and Counterpart is encouraging NSRC to address the problem head-on: either reduce the number of field implementation projects or else fund-raise more aggressively. From experience, Counterpart itself realizes that attempting to carry out too many field initiatives with too few resources can threaten the success of an entire program.

Communication between Washington, DC, Sri Lanka, and the Philippines is fair but not excellent, although all parties can chat by email. Part of the challenge is cultural – different world views and differing styles of communication. Counterpart believes that with time and effort we can improve communication. All partners would concur, that in a spirit of understanding, open and frank communication is critical to the success of the partnership.

A key to success will be information management, and it is clear from the challenges in obtaining the key hard data on crops, sales, and incomes that we have not yet mastered the issue of data management. This will be a major focus for Year 2. This applies to Sri Lanka as well as the Philippines. We are currently developing a flexible information architecture that we hope will serve as a central repository of the entire program's data (financial, social, silvicultural, enterprise-focused etc.)

### **III Changes in Project Design**

Since the revised Detailed Implementation Plan was submitted July 15<sup>th</sup> 1997, there have been no significant changes in Sri Lankan operations, although a coral reef restoration site has been added to the program. While Counterpart HQ has some questions about the applicability of this component, we believe it is a fascinating experiment in applying Forest Garden principles to a marine ecosystem. A main point in its favor is that coral reefs are very sensitive to onshore pollution and upland erosion – issues directly addressed by our other Forest Garden field activities. Thus the reef restoration project is a perfect counterpart to the upland restoration activities. Both activities are needed to address the resource degradation issues of Sri Lanka over the longer term.

extended sustained technical assistance to participating Forest Garden field sites, and attended one international training

- Linked Forest Garden field sites with local government units, key government departments, and local and foreign resource agencies
- Raised match funding in the amount of \$26,000 (documented) and \$10,000 (documentation in process)
- Set the initial stages for the marketing of Philippine Forest Garden Products Year 1 of the Philippine segment of Forest Garden Program set the preparatory stage for the production of forest garden products and their marketing in the latter part of Year 2 Specifically, Year 1 of the program saw the incorporation of the Philippine Forest Garden Products Corporation with the Securities and Exchange Commission and its registration with the Department of Trade and Industry

A feasibility study undertaken by the corporation on the marketing of Forest Garden products is in the final stages of writing Early on, the members of the Board of Directors underwent leadership training and a full session on strategic planning The country staff of Counterpart International/Philippines also assisted the members of the board conduct a focus group discussion with the farmers/forest gardeners of Nug-as, Alcoy and gather collateral market information in the village market

## II Constraints, Unexpected Benefits and Lessons Learned

The participation of Leonardo Chiu (director) and Edwin Alemania (forester) in the Sri Lanka Workshop in November 1997 set the stage for introducing Forest Garden to the Philippines This was reinforced by a visit to the Philippines by Dr Ranil Senanyake in early 1998 Mr Chiu's field experience in the Central Visayas allowed him to adapt the Forest Garden program to local conditions in a manner that ensured initial acceptance of the concept In this manner, the Sri Lanka Forest Garden initiative provided the basis for directing the program's translocation across national boundaries, and to the Philippines program

In the process of adapting the program to the Philippines, however, challenges presented themselves that Forest Gardens up until that point had yet to confront One of the greatest of these relates to land rights In the Philippines, there are two forms of land tenure The first is the alienable/disposable land which can be titled in favor of certain claimants The other is forestal/timberland/public domain land which belong to the government but which can also be leased or contracted to private individuals and entities Our Forest Garden Program in the Philippines addresses the land tenure issues of both kinds of lands

Entitlements to alienable/disposable lands come in the form of Original Certificate of Title (in case it is the first title of the land in question) and in the form of Transfer

Certificate of Title (in case where the land in question has been transferred by the original owners by inheritance, sale, donation and other forms of conveyance)

Entitlements to forestal/timberland/public domain lands are in the form of Community Stewardship Contracts for individuals and Community-Based Forest Management Agreements for organizations. But these are merely instruments. And like any other instruments, particularly the Original Certificate of Title, they can be acquired by parties who are undeserving of these instruments but who exercise a certain amount of persuasive control over the agencies issuing them. What we are doing in the Philippines, therefore, is to assist communities and Forest Garden participants to acquire entitlements to lands they have been claiming for years, and even assist them to acquire it from landowners in articulation of the government's Comprehensive Agrarian Reform Program. This we do through the following processes:

- Engage Forest Garden participants in community-based planning and strategic formulation. In Forest Garden communities, the acquisition of tenurial instruments is part of the mission statement.
- Strengthen organizational and individual leadership.
- Participate in the formulation/reformulation of policies at the level of the barangay (village) government.
- Undertake mass mobilization initiatives. For example, in the recently concluded May/98 elections, local and national candidates for elective offices were asked by Forest Garden communities to sign a covenant with them. One item in this covenant stipulates that the candidates, if elected into office, will work for entitlement of the lands occupied by individual participating in the Forest Garden sites.
- Promote involvement in networking and coalition work.

In addition, an orientation on land tilling and tenurial rights was undertaken in the village of Tabla, Liloan. Attended by 14 farmer members of Tabla Multi-purpose Cooperative Inc., the law firm of M R Lepiten and Associates discussed legal requirements of land tilling and the processes of acquiring land titles.

The following issues and problems were also encountered during project implementation:

The participation of the members of Forest Garden partner Tabla Multi-purpose Cooperative in Tabla, Liloan was perceived to be decreasing. One immediate cause of this problem might be the lack of coordinating skills within the leadership of the village organization.

In Tabla, there exist a number of intermediate institutions and agencies which vie for the time of the organization which is administered largely by women volunteers who have domestic chores to attend. The men of this village (caught in the middle of a vanishing

agricultural character and emerging urban values), are forced to leave their marginal lands for various odd jobs in the nearby cities of Cebu, Mandaue, Mactan and Danao. As a consequence, agricultural production is presently limited to the traditional mango production and cattle fattening. While this situation offers good opportunities for applying our methodologies, the participation of the members and leaders of the village organization is critical to the success of the Forest Garden Program in the area.

To respond to this situation in Tabla, the plan to establish a nursery/ demonstration farm in the area was reconsidered and it was relocated to Nug-as and Basak. These two areas offer more viable conditions for the success of a Forest Garden project. In Tabla, a core group of 10 farmers exhibited and maintain a clear interest in Forest Garden activities. Each of the participating farmers is expected to nurture a backyard nursery to support the development of their Forest Garden.

There were matters resulting from the El Niño phenomenon which brought about water shortages especially in the Forest Garden site in Nug-as, Alcoy. Counterpart International/Philippines attempted to respond to this situation by providing the Kahugpongan sa mga Mag-uuma sa Yutang Lasangnon sa Bololacao with galvanized containers for rain water. It also sought the assistance of the University of San Carlos - Water Resource Center, with the cooperation of a Peace Corps Volunteer, to explore the possibility of rehabilitating and developing the existing water catchment system in the area.

The need to hire the services of an agriculturist who can assist partner organizations in crop production activities surfaced as a concern for the upcoming year (Year 2).

Forest Garden activities planned in Catmondaan, Catmon were delayed for two months (July and August). The failure to undertake these activities was due to the delay on the part of the partner Catmondaan farmers' association to formally invite Counterpart International/Philippines. The group also wanted to forge a formal agreement with Counterpart International/Philippines prior to the implementation of Forest Garden Program in the area. Signing of the memorandum of agreement between the village partner Hiniusang Mag-uuma sa Catmondaan Inc. and Counterpart International/Philippines was accomplished in 12 September 1998.

After 10 long months of El Niño drought, most of the farmers in the Forest Garden site in Basak, Badian spent most of their time planting corn to replenish their subsistence stocks. There were only five farmers who were able to establish hedgerows and rock walls. Others focused on their corn fields. However, farm lay-out and sticking activities were conducted, in preparation for the land's use as Forest Gardens. Soil and water conservation measures, such as the planting of hedgerows and installing rocks, are to be done after harvest in September.

Due to limited logistics and funding support, resource surveys were brief, tentative and will be subject to more exhaustive undertaking in Year 2.

Counterpart International/Philippines failed in the test case of increasing the productivity of Tabla, Liloan farmers engaged in barbecue stick production. The manually-operated machine designed by a fabrication firm on orders of Counterpart International/Philippines did not achieve the desired productivity.

An important constraint in developing true "Forest Gardens" in the Philippines relates to agricultural traditions that have dominated Cebu and Region 7 over the last decades. Use of pesticides and hormones and fertilizers have been widespread and continue in some instances. Many of the soils and aquifers contain these chemicals or their breakdown by-products, and it will thus be a challenge making these lands and the products grown on them fully organic.

### **III Changes in Project Design**

The overall Philippines implementation design is moving ahead as planned in the Detailed Implementation Plan with no substantive alterations.

## **REGIONAL**

### **I Overview of Year 1 and Changes Subsequent to DIP**

The Regional office of Counterpart International is in Nuwara Eliya, Sri Lanka, and supports the activities of Dr. Ranil Senanayake, founder of Analog Forestry and Regional and Scientific Director of the Forest Garden Program (see **Attachment 3**, Regional Annual Report).

During the first year, the Regional component supported the development of the country programs in Sri Lanka and the Philippines by providing technical input for project design and evaluation strategies.

In terms of providing support to local implementing NGOs in Sri Lanka, in every month meetings were held with individual Field Team leaders as well as a combined Team meeting once a month. Thus for Sri Lanka, approximately 88 local meetings and 11 national meetings with the implementing NGO were held. In the Philippines, five meetings with local implementing partners and two meetings with Counterpart International/Philippines were held. This included an intensive course in Analog Forestry and Landscape Management.

In November 1997, a two-week Forest Garden training session was conducted by Dr. Ranil Senanayake at NSRC. Attended by some 30 participants, including Mr. Vosseler, Dr. Beehler and the late Nicholas Bowness, the training was a mix of theory, workshops, field visits to forest garden sites and hands-on observation at the research center.

The development of definitions for the Total Ecosystem Management concept was developed through consultations with regional NGOs. The concept was discussed during all local meetings held in Sri Lanka. The outcome of these consultations were developed

for the web page being created by the late Nick Bowness, Dr Beehler, and Dr Senanayake

Certification-The Regional office supported the development of a certification system for Forest Garden Products (FGPs) This included

- the creation of a “Standards and Procedures Manual” for the International Analog Forestry Network (IAFN)
- work with Mr Lawrence Goldberg of the NSRC Forest Garden Product certification office on streamlining the certification process for Sri Lanka
- developing a series of “Indicator Species” for certification evaluation

The Regional office supported the establishment of marketing links In this regard

- 8 meetings were held with M/S Lanka Organics Ltd on the export of certified Forest Garden Products An agreement to promote FGPs in their marketing program was obtained
- In June 1998, a meeting was held with the export Development Board of Sri Lanka who is now interested in providing official recognition to the certification process

International Conferences-Promotion of FGPs

- Philippines- A roundtable conference was also conducted by Dr Senanayake on 23 March 1998 The conference drew the participation of top-level officers of the Department of Environment and Natural Resources in Region 7 In attendance were all the regional technical directors, the provincial environment and natural resource officers of three island provinces and the community environment and natural resource officers in the region Discussions centered on biodiversity
- Madre de Dios, Peru- a meeting was held in June with seven international and fifteen local NGOs on Analog Forestry design and certification procedure
- Washington, DC- Consulative Group on International Agricultural Research (CGIAR) Natural Resource Management Workshop (October, 1998)

The Regional office has been working with Dr John Jack of Monash University, Melbourne, Australia to develop a data management system for the application of Forest Gardens for all the NGOs working on the concept A series of meetings were held with Dr Jack at Counterpart's office in Sri Lanka in June 1998 It is expected that Dr Jack will work closely with Dr Kevin Vang, of Counterpart's partner organization in Australia (the Australian Foundation for Asia and the Pacific) to formalize this information architecture in support of Forest Garden

## II Constraints, Unexpected Benefits and Lessons Learned

The program is benefitting from Dr Senanayake's global network of institutional and scientific collaborators. In this regard, Dr Senanayake confers with members of this network year-round and travels to a range of international workshops and symposia – both taking in new information and spreading the word about Forest Garden and Analog Forestry. Dr. Senanayake has visited Counterpart's Washington's headquarters on three occasions in Year 1, which has greatly aided communications on the Program.

Members of the Forest Garden initiative continue to struggle with effective, timely, and focused communications. Our main vehicle for communication remains email, which has its strengths and weaknesses. The ability of NSRC (Sri Lanka) and the Regional Office to send and receive attached/formatted files will greatly aid in this process – especially with regard to production of coordinated and co-authored documents.

### **III Changes in Project Design**

There have been no substantive changes in Region Program design since submission of the DIP.

## **HEADQUARTERS**

### **I Overview of Year 1 and Changes Subsequent to DIP**

Counterpart International's *Division of Environment and Natural Resources* (DENR) is committed to fostering sustainable development through field initiatives in agriculture, forestry, integrated conservation and development and marine and terrestrial resource management. DENR employs a Total Ecosystem Management (TEM) approach that integrates traditional, indigenous systems of resource management with appropriate modern technologies. USAID's Forest Garden Initiative remains the centerpiece of DENR's international activities.

The vision for the USAID-funded Forest Garden program remains little changed from that elaborated in the original proposal as well as that in the DIP. Counterpart sees the program as on-course and on-schedule.

Forest Garden has been a main focus of the Division of Environment and, in fact, has been a rallying point for the establishment of the Division as a credible and adequately-staffed entity within Counterpart International. DENR is the youngest of Counterpart's Division's and thus has struggled to define itself and to develop a coherent mission. Staff affiliated with or assisting in the development of the Forest Garden program have helped the Division coalesce around this signature program. We now envision that DENR will focus on activities that grow out of one or a few signature programs that could be implemented in countries around the world.

Today, the Forest Garden team includes

- Bruce Beehler, Director, Forest Garden Program

- Aaron Becker, Forest Garden Program Officer
- Kim Moller, DENR, Program Manager for Coastal/marine Issues (developing a Forest Garden initiative in Mexico, and, because of his business experience, is taking the lead in enterprise development for Forest Garden Products internationally )
- Vance Hartke, program development for Forest Garden initiatives
- Tony Dinicola, Climate Change Officer, is marketing Forest Gardens as an appropriate carbon sequestration activity, with proposed projects in India and Mexico

Note, only two of the five list team members are full-time Forest Garden proponents But our staff works as a team, and we share the workload of larger initiatives

Additionally, Dr Kevin Vang has visited the Forest Garden projects in Sri Lanka and the Philippines and his institution, AFAP, has invested in Forest Garden in those two countries through the provision of AusAID funding (a match for USAID) Thus, we have an international partner at this time in support of the initiative

At this time, we have budgeted for a Forest Garden intern, who will assist Beehler and Becker in the administrative management of the program from Washington, DC

Beehler traveled to the Philippines and Sri Lanka twice during Year 1, in order to gain first-hand experience with field implementation, and to work closely with in-country teams in the details of program development These field missions were very productive, and will continue, with Beehler and/or Becker visiting in-country twice per annum

Implicit within the PVC Matching Grant is an institutional strengthening component that enabled Counterpart to hire Aaron Becker for Forest Garden Becker has been charged with the primary responsibility of (1) defining and implementing a global marketing strategy for Forest Garden Products produced in Sri Lanka and the Philippines, (2) establishing market links, (3) assisting field program development, and, (4) assisting with administration of the program in the Washington headquarters

The Counterpart Forest Garden working group has focused on program definition and strategy, technical development, and documentation In so doing, it has helped DENR establish a strategic center, and has given the Division an initial mission focus that has been an important boost One of the greatest challenges to the Division has been to establish a niche where it can compete for additional (match) funding with the larger and older environmental institutions In this, we are quickly approaching our goal Counterpart's DENR now has eight permanent staff, nearly doubling over the last twelve months, and this core staff includes a valuable range of expertise and geographic focus This would not have occurred without the Matching Grant or the strategic mentoring/partnership with EarthVoice/HSUS

The latter strategic partnership has already proven a success EarthVoice provides a valuable policy development arm to Counterpart and Counterpart gives EarthVoice a platform on which to collaboratively develop field initiatives EarthVoice-funded staff

are based at Counterpart and work with our Counterpart team to develop field programs that address EarthVoice's policy mandates

Counterpart, furthermore, is establishing additional strategic linkages that will benefit Forest Garden. As a member-to-be of the International Analog Forestry Network (IAFN), Counterpart will tie in with the network of institutions that promote development of Forest Gardens and Forest Garden Products. Counterpart is also looking to establish linkages with the Rodale Institute in order to foster broader development of Forest Garden principles in more target communities and to create a stronger marketing network.

## **II Constraints, Unexpected Benefits and Lessons Learned**

A major challenge to Counterpart's Forest Garden operations in Year 1 was related to staff leadership for the Program. In early 1997, David Vosseler, Counterpart Vice President for Programs and creator of the Forest Garden Program departed Counterpart to take a position with Fauna and Flora International. Dr. Bruce Beehler was asked by senior management to assume acting directorship of the Division of Environment, and carry out day-to-day oversight of the Forest Garden initiative. Beehler brought Aaron Becker on to provide intern assistance on the initiative. Becker has since been elevated to Forest Garden program officer, and a new intern is being recruited to replace Becker in that slot. At that point, Forest Garden will be fully staffed for efficient operations in Washington, DC. We expect to have this new intern on staff by December 1998.

## **III Changes in Project Design**

From the vantage point of the Washington, DC office, the program has changed in no substantive way since submission of the DIP. We expect that there may be minor changes in Year 2, but cannot predict in which sectors. We suspect the international marketing component of the program is the most complex and perhaps is most subject to redevelopment. This should be an important Year 2 and Year 3 activity.

## **STRATEGIC QUESTIONS**

The following major issues/questions were posed by USAID's Gregory Perrier in an informal discussion held in October 1998 with Counterpart staff:

1 *Documenting income enhancement of Forest Gardeners farmers over time.* Initial data are available from Sri Lanka but these have been shared without detailed documentation. Explicit data and social and personal detail will be required as a basis for general summary information. These data will be forthcoming from the Philippines at a later date. It is imperative that the Philippines team is carrying out baseline income assessments in start-up communities.

2 *Evidence that Counterpart is examining the organic agricultural markets in a manner that will show how much production the market can bear.* Evidence that we are looking at this program from all of its business and market angles. The clear key to success of the Forest Garden program is the enterprise component. Rural Forest Gardeners must achieve

enhanced annual income from making the transition to Forest Gardening. And this effect must be sustained. Counterpart must carry out sufficient market analysis at national, regional, and international scales to determine that markets are not quickly saturated, with price collapses to follow. These data will be collected in Year 2. Initial information for the US market in organics indicates that the market is expanding at a rate of ca. 20% per annum. For products currently coming online in Sri Lanka, Mr. Becker is utilizing contacts with USDA's Economic Research Service to gather supply/demand and price information on organic imports.

*3 Plan for biodiversity monitoring and initial evidence that FG activities in focal communities actually benefit local native biodiversity.* The Sri Lanka program has carried out detailed biodiversity assessments. Data for the Philippines are fewer and weaker. It will be important to obtain strong baseline data from the Philippine project communities in Year 2.

*4 Data on farmer adaptation or resistance to adaptation to FG principles. What objective evidence do we have the rural communities are buying into the FG?* Convincing rural farmers to change their planting strategies is always a difficult task, even under the best of circumstances. The advantage of Forest Garden is that it does not require a farmer to invest more than a fraction of his tillable land into the new technology, and he/she can continue subsistence cropping (rice, corn, etc.). In Year 2 it will be important for Counterpart to document, through fieldwork by NSRC, CI/Philippines, and the Regional Director, these issues of farmer resistance, adoption, success and failure with Forest Gardens.

TABLE 1 a Sri Lanka Program Forest Garden Time Line Implementation Plan										
	Year 1			Year 2	Year 3	Year 4	Year 5			
Establish Sri Lanka Office (yr 2 re-development)	X	X								
Hire Program Field Staff	X	X								
Select Partner Groups and Field Sites		X	X	X						
Workshops	X									
Ongoing Relationship Building with Field Sites		X	X	X						
Development of Sri Lanka Program plan		X	X							
Resource Surveys										
Land surveys		X	X	X						
Community surveys			X	X						
Biodiversity surveys				X						
Monitoring (develop systems)		X	X	X						
Garden development			X	X						
Garden production										
Biodiversity		X	X	X						
Tech Assistance to FG farmers		X	X	X						
Building Linkages to local institutions				X						
Marketing of FG Products				X						
Sri Lanka Program Annual Review				X						
Sri Lanka Program Evaluation (Mid-term+ Final)										
Match Fund-Raising				X						

Sri Lanka component  
On schedule as of October 1, 1998

57

TABLE 1 b Philippine Program Forest Garden Time Line Implementation Plan										
	Year 1			Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Establish Cebu Office	X	X								
Hire Cebu Staff		X								
Select Partner Groups and Field Sites		X	X							
Development of Philippine Program plan		X	X							
FG Training of Cebu Staff	X	X	X							
Workshops	X	X								
Initial Relationship Building with Fieldsites		X	X	X						
Resource Surveys										
Land surveys			X							
Community surveys				X						
Biodiversity surveys				X						
Monitoring (+develop systems)			X	X						
Garden development				X						
Garden production										
Biodiversity				X						
Tech Assistance to FG farmers			X	X						
Building Linkages to local institutions		X	X	X						
Marketing FG Products										
Philippine Program Annual Review				X						
Philippine Program Evaluation (Mid-term + Final)										
Match Fund-Raising			X	X						

Philippine component  
On schedule as of October 1, 1998

11

**TABLE 1 c Regional Program Forest Garden Time Line Implementation Plan**

	<u>Year 1</u>				Year 2	Year 3	Year 4	Year 5
Establish Regional Office	X	X	X					
Develop Regional Implementation Plan for FG Initiative	X	X	X					
Complete Analog Forestry Publication			X					
Training								
Sri Lanka			X					
Philippines		X						
Regional Workshops	X							
Establish Regional Institutional Linkages for FG								
Oversee Development and Management of Monitoring	X	X	X					
Public Awareness Campaign on Forest Garden			X					
Development of Product Marketing Network			X					
Development of Certification Process and Network			X					
Evaluation and Oversight of Field Activities	X	X	X	X				

Regional Component  
On schedule as of October 1, 1998

14

TABLE 1 d Counterpart Headquarters Forest Garden Time Line Implementation Plan								
	Year 1				Year 2	Year 3	Year 4	Year 5
Overall Program Coordination	X	X	X	X				
Field Visits	X	X		X				
Coordination of Data Management								
Public Awareness								
Web Page Development			X	X				
Brochure on Forest Garden (and revision)				X				
FG Handbook								
TEM Handbook								
NGO Mentoring and Collaborative Development (EarthVoice)		X	X	X				
Market Development of FG Products				X				
Annual HQ FG Program Review				X				
HQ FG Program Evaluation (Mid-term +Final)								
Match Fund-Raising				X				
Financial Management of Overall Program	X	X	X	X				
Program Reporting				X				

Headquarters Component  
On schedule as of October 1, 1998

18

**Table 2 a Project Goals and Objectives Sri Lanka**

Goal 1 Improve living conditions and income of rural agriculturists Goal 2 Improve quality of rural environments and restore local biodiversity					
Project Objectives by Intervention	Measurable Indicators	Measurement Method How/When	Major Planned Inputs and Activities	Outputs	Progress as of October 1, 1998
1 Shift local cash crop planting regimes	Acceptance level of Forest Garden field projects in different eco-zones	No of participating forest gardeners	Four regional field programs for Forest Gardens	Total acreage in FG	Total of 892 acres of land covered by Forest Gardens
2 Develop 1,100 forest gardeners	Farmers are able to create a yearly and strategic/five year plan	Farm development plans, survey, monitoring reports	Training, workshops, technical assistance  Individual farm work and group farm work  Obtain and utilize appropriate organic materials, undertake soil and water conservation measures and promote site-stable strategies	Developed individual and/or communal Forest Garden  Agricultural products produced and trees planted  Organic products harvested	Forest Garden farmers in Year 1  Female= 398 Male= +289 TOTAL 687
3 Expand and develop the nursery and herbarium	Increase in the production of planting stocks and their availability in the arboretum and nurseries	Number of seedlings propagated and produced by the participating community and farmers	Participating communities and farmers propagating seedlings and planting materials and improving livestock breed  Technical assistance/training	Seedlings and planting materials surviving for use in Analog Forest and cultivation of Forest Garden Products	# of seedlings in poly bags this year= 90,000  Species Available to the Project  64 plant species 47 fruits, spices, fibre crops 34 vegetable 27 herb 18 medicinal plants 52+ Rainforest Rescue transfers, orchids, others (see Sri Lanka Annual for complete list of species indicators)
4 Increase net value of annual cash cropping per farmer	Farmer income	Net change annual income of farmers	Niche market assistance activities	Value-added product	Uva Nursery sells more than Rs 800,000 in past year from sales of nursery products Income incr Rs 3000- Rs 3500

Project Objectives by Intervention	Measurable Indicators	Measurement Method How/When	Major Planned Inputs and Activities	Outputs	Progress as of October 1, 1998
5 Establish recognized FG certification At least 50% of gardeners obtain certification	Farmers are producing at least 2 certified Forest Garden products	Quantity/sale of certified FGPs/annual Standards verified through field visits and site inspections	Trademarking of FG label, establishment of organic product lines Farmers are applying for certification	Forest Garden Products (FGPs)	-FGP recognition is ongoing -85 Forest Gardens currently certified -Certification component in need of future funds for expansion
6 Build national and international value-added markets for crops	Specific names and addresses of buying stations wholesale and/or retail outlets Number of contracts with forest gardeners	Number of participating wholesalers and procurement offices	Link forest gardeners with already established organic farming communities and marketing groups  Develop relationship with Lanka Organics and Sri Lankan Export Development Authority  Web Page, media campaign	FGPs in retail supermarkets and health food stores  Increase in economic participation by forest gardeners	-Marketing links/relationships are being established -Strategic plan to be developed in early Year 2
7 Increase forest and vegetation cover in focal communities	Increased biodiversity and mature green cover	Hectares under Forest Garden cover per year	FG implementation and field support staffing	FG plantings	-see current list of indicator species for baseline
8 Increase biodiversity values in communities and environs	Increased biodiversity and mature green cover in long-run	Baseline biodiversity censuses/annual	Biodiversity values & stewardship training	Restored populations of native wildlife and vegetation	Educational and orientation programs, coastal zone/mangrove cleaning campaign, meetings with villagers and govt officials

**Table 2 b Project Goals and Objectives Philippines**

Goal 1 Improve living conditions and increase income of rural farmers Goal 2 Improve quality of rural environments and restore local biodiversity					
Project Objectives by Intervention	Measurable Indicators	Measurement Method How/When	Major Planned Inputs and Activities	Outputs	Progress as of October 1, 1998
1 Introduce Analog Forestry and Forest Garden to the Philippines	Acceptance level of Analog Forestry and Forest Garden by DENR, LGUs, NGOs and Village Organizations	Media reports, departmental briefings and memos of understanding	Workshops, training, field sessions, roundtable conferences, briefings and forum	Broad public knowledge of, and government support for, Analog Forestry and the Forest Garden program	Obtained support from participating communities, government and private agencies, including -The Department of Agriculture -The Department of Environment and Natural Resources -The Philippine Coconut Authority -Phil-German Cebu Upland Project -Univ of San Carlos-Water Resource Center -CARE Philippines -Moalboal Orchid Gallery -Mag-uumad Foundation, Inc -broad Cebu news coverage of FG plans
2 Develop 1,000 forest gardeners At least 50% of gardeners obtain certification	Farmers are able to create and implement a yearly and strategic/five year farm development plan  At least 10% of the farmland is allocated to Analog Forestry  Farmers are producing at least 2 certified forest garden products	Farm development plans, survey, monitoring reports  Farm planning and site inspection  Field visits and site inspections verifying certification standards (to be developed)	-Training, workshops, technical assistance -Individual farm work and group farm work  -Obtain and utilize appropriate organic materials, undertake soil and water conservation measures, and promote site-stable strategies  -Farmers are applying for certification	Developed individual and/ or communal Forest Garden  Agricultural products produced and trees planted  Organic products harvested	Involvement of 4 Cebu Province communities, 250 households (or a total of 1,000 household members), 250 hectares of individual farm lots and 1,100 hectares of communal reforestation farms for Year 1  -Certification- no certified farms to date

21

Project Objectives by Intervention	Measurable Indicators	Measurement Method How/When	Major Planned Inputs and Activities	Outputs	Progress as of October 1, 1998
6 Enabling partner communities to plan, manage, monitor and evaluate their participation in the program	Demonstration of knowledge, aptitude and skills in organizational management, strategic planning, financial matters, problem solving and resource accessing and allocation	Periodic performance review, feedback from members of the organization, verifiability of systems in place, and assessment of value added brought into the community	Extension of critical needs training re technical assistance, information management, systems development, and networking and coalition building	Strong, cohesive and efficient organizations capable of managing self-defined needs	-Please refer to enclosed Counterpart International/Philippines Annual Report
7 Organize a pool of trained barefoot Analog Forestry and Forest Garden technicians	Number and gender distribution of barefoot Analog Forestry and Forest Garden technicians	Members of the participating communities and external organizations tapping the services of barefoot Analog Forestry and Forest Garden technicians within the pool	Conduct training and technical assistance, exposure to actual field situations through cross-visits, granting special studies and mentorships	Adoption of Analog Forestry and the Forest Garden program by the larger community, survival rates of trees planted, members certified as forest gardeners, and overall improvement of the community's agricultural productivity and forest situations	-2 Foresters + 1 Utility person hired -Training of CI/Philippines staff in Forest Garden, agroforestry techniques, biodiversity/land community resource surveying -5 biodiversity resource mapping and farm planning activities conducted by country program staff in all 4 FG sites, with some 168 farmer-leaders and members attending
8 Enhancing participation of partner organizations in Forest Garden by assisting members acquire land entitlements	Certified/true copies of land entitlement documents	Some 200 deserving members of participating Forest Garden organizations possessing land entitlement documents as issued to them by appropriate government agencies	Provision of legal aid to participating Forest Garden organizations	Improvement of the conditions of participating Forest Garden farmers (assumed here to value their land more now that entitlement is issued in their favor)	Orientation on land tilling and tenurial rights attended by 14 farmer-members of Tabla Multi-purpose cooperative The law-firm of M R Lepitan and Associates discussed legal requirements for acquiring land titles, tenurial instruments of the government, issues of tilling lands where watersheds are located

22

**Table 2 c Project Goals and Objectives Headquarters and Regional**

Goal 1 Increase capacity of Counterpart and its Partners to Manage and Implement the FG Initiative

Goal 2 Develop and expand operational and programmatic partnership with EarthVoice/HSUS

Project Objectives by Intervention	Measurable Indicators	Measurement Method How/When	Major Planned Inputs and Activities	Outputs	Progress as of October 1, 1998
1 Build capacity of Counterpart's Division of Environment and Natural Resources	Full-time employees of the Division  Successful Forest Garden matching-grant proposals  Non FG grant proposals funded  Citations and recognition received for field initiatives	Annual staff list  Periodic performance reviews, feedback from other Divisions at Counterpart HQ, feedback from partner organizations  Funds garnered by Division for FG and non-FG field initiatives	New staff additions Agricultural Marketing Specialist, interns	Strong, cohesive, and efficient outreach/ implementation	*List DENR staff accomplishments -Hired intern and Organic Agriculture/Marketing Program Officer
2 Establish a self-sustaining NSRC administration in Sri Lanka	Match-funding obtained  Functioning cost-recovery mechanisms	NSRC annual report and annual budget	An independent office, office staff, and equipment procurement	Strong administrative and financial management	An issue being actively addressed as Kamal Melvani transitions from volunteer Director to full-time, paid Director
3 Consolidate and strengthen the FG NGO network in Sri Lanka	List of working contacts, partners  Information sharing generated via meetings, seminars  Operational extension offices in 4 eco-zones	Review of collaborative NGO list  Range of network activities	Network workshops led by regional leadership  Information sharing re technologies, training methodology, strategic management, etc	Strong networks capable of sustainably managing resources and promoting the TEM approach to conservation	Preliminary field projects well developed, additional sites and villages to be added once additional funding is secured Expansion of project is currently constrained by funding limitations
4 Establish an outreach-driven Regional Office in Sri Lanka	New partnerships with community groups and community members  Exchanges of staff between Sri Lanka/ Philippines	Annual regional office reports  Community and FG participant surveys and questionnaires	Construct office, staff office  Training program plan  Monitor/evaluation plan	Improvement of conditions for participating forest gardeners and their communities An informed FG program	Established and fully operational

Project Objectives by Intervention	Measurable Indicators	Measurement Method How/When	Major Planned Inputs and Activities	Outputs	Progress as of October 1, 1998
5 Establish an independent and capable FG Program Administration in Cebu City	Match-funding obtained  Functioning cost-recovery mechanisms	Annual report of Cebu program office	workshops, training	Strong administrative and financial management	Established and operational
6 Develop a strong CBO network for FG in Philippines (Regional)	List of working contacts, partners  Information sharing generated via meetings, seminars	Census of NGO participants/annual	NGO forum, workshops  Information sharing re technologies, training methodology, strategic management	Strong networks capable of sustainably managing resources	Initial working relationship established with four CBOs, additional under negotiation
7 Expand the collaboration between Counterpart and EarthVoice on the FG initiative (HQ)	1 staff member of Earth voice trained in managing, reporting and implementing a USAID project	Detailed summary of collaborative activities/annual	Ongoing establishment of staff and program links	Joint programs, Joint brochures, Joint project plans,  1 staff member of Earth Voice trained in the FG program	EarthVoice-funded staff have bought into FG and promote FG in meeting and funding proposals
8 Develop functional and operational linkages between EarthVoice and Counterpart on all Environmental programs	List of common environmental projects	as above	as above	as above	Earth-Voice staff working daily with Counterpart staff developing FG and nonFG initiatives

24



BEST AVAILABLE COPY

25

# TOTAL ECOSYSTEM MANAGEMENT

## *The Project in Sri Lanka*

This is the report on the first six months of activity in the Forest Garden Project, in Sri Lanka. This project is funded by USAID/Counterpart International, U S A and is being implemented by the Neo Synthesis Research Centre

The information is compiled separately for all project sites

SECTIONS	PAGES
a) Montane zone Walapane & Nuwara Eliya areas	1 - 6
b) Intermediate zone Nikapotha & Karandagolla areas	7 - 19
c) Wet Zone Haldolla & Bopath-ella areas	20 - 26
d) Dry & Intermediate zones Moneragala & Mahiyangana areas	27 - 33
e) Wet Zone, mangroves & wetlands Kalutara district	34 - 45
f) Coastal eco-zone Rumassala, Galle	46 - 52
e) NSRC and other other projects	53 - 59

*The picture shows the office site of the Wetland Project at Kaduruduwa island in Panadura*

*(\* refers to being endemic to Sri Lanka)*

**Co-ordinator - Mr. Ajantha Palhawardana**

**Location - Montane Zone, Walapane and Temple Forest Project**

**1 Total number of Farmers**

Male Farmers	-	35
Female Farmers	-	7
Total Number of Farmers	-	42

**2 Existent and Potential Forest Garden Crops**

Common Name	Botanical Name	Use
Mango	<i>Mangifera indica</i>	Fruit
Avacado	<i>Persea americana</i>	Fruit
Banana	<i>Musa acuminata</i>	Fruit
Guava	<i>Psidium guajava</i>	Fruit
Lime	<i>Citrus aurantifolia</i>	Fruit
Orange	<i>Citrus sinensis</i>	Fruit
Jak	<i>Artocarpus heterophyllus</i>	Fruit
Del	<i>Artocarpus altilis</i>	Fruit/vegetable
Kahata	<i>Careya arborea</i>	Fruit
Cashew	<i>Anacardium occidentale</i>	Nut
Coconut	<i>Cocos nucifera</i>	Nut
Puwak	<i>Areca catechu</i>	Masticatory
Coffee	<i>Coffea arabica/robusta</i>	Beverage
Pepper	<i>Piper nigrum</i>	Spice
Cinnamon	<i>Cinnamomnum zeylanicum</i>	Spice
Ginger	<i>Zingiber officinale</i>	Seasoning
Tumeric	<i>Curcuma domestica</i>	Seasoning
Anato	<i>Brixa orelliana</i>	Food Colouring
Kitul	<i>Caryota urens</i>	Sugar
Kitul Treacle	"	
Dried Herbs(culinary)		

**3 Total Land Covered**

Approximately - 45 Acres

**4 Total Monthly Income**

Average Rs 2500 00 per month

**5 Summary of Activities**

January 1998

\*Farmers and monks received training

\*25 farmer groups trained in Analog Forestry

\*Pilot farm at Katakandura has been used as an extension instrument.

\*Training Program arranged for making compost Dr Bruce Bheeler visited the site ,  
Katakandura Analog Forestry Pilot Farm for FGP Certification Demonstration

\*Temple Forest Brochure in the Sinhala language was developed.

## February 1998

- \*Awareness, social mobilisation & extension work carried out for the monks and the village participants
- \*Finalised the existing maps for 8 farmers
- \*66 species of Plants including Medicinal plants were marked on the Temple Forest map
- \*Library has been established in the Temple
- \*An antique Book cabinet was donated to the temple by a Dayake (lay community member)
- \*Alternative species of plants discussed for use in the of SALT (Sloping Agricultural land Technology) system
- \*Problems of farmers/community discussed at Walapane Temple which are
  - Non availability of water during dry season
  - Difficulties of soil fertility
  - Pest & disease problems in agriculture
- \*Preparatory work for the Temple medicinal plant garden was completed.
- \*Rare plant (*Strobilanthes sp*) propagated and planted in the temple
- \*Endemic snake (*Rhinopis drummandnay*) recorded in the Temple area.
- \*Endemic, Rare, Orchid (*Oberonia thwaitesii*) recorded in the Temple area.

## March 1998

- \*Removed the polythene covers of the freshly prepared plant beds
- \*Cleared the area behind the monastery and prepared the steps, drain and a pit for garbage
- \*Prepared a pathway, cleaning the area, removing the wild plants
- \*Drawing of maps of the prepared areas
- \*Explaining to farmers about Analog Forestry
- \*Participated in a workshop of the Monaragala Forest Garden Project

## April 1998

- \*Mapping of Manelwala home gardening completed.
- \*Ministry of Environment and Forestry has allocated Rs 1 million for the further development of temple forest project
- \*Problems identified at Watarakgoda temple with Manelwala farmers which are as follows
  - Scarcity of water
  - Infertility of soil
  - Low house hold income
  - Poor institutional relations and inactive community organization.
- \*Finishing the interior of the Pattipola Information Centre It is now ready to store information & start the Sales Outlet.
- \*Several orchid plants rescued and transferred to the NSRC Rain Forest Rescue collection

## May 1998

- \*448 species of trees reported in Walapane
- \*100 *Strobilanthes sp* plants distributed to participants Planting trees will be started with the rain
- \*6 species of orchids and 12 species of Reptiles are recorded.

## June 1998

- \*No planting due to dry weather
- \*Farmers spend their time to modify their own farm plans
- \*Mapping of 36 farmer's gardens completed
- \*Turmeric & Ginger found to be highly requested by the farmers
- \*60 farmers and 50 priests who had already been trained will carry out the Analog Forestry workshops in the future

## 6 Matching Activities

- \*Establishing and arranging books in the Temple Forest Library
- \*Purchasing a pair of binoculars for the Temple
- \*Establishment of a foot-path inside the temple forest area
- \*Shramadana (voluntary) work to clean the Temple surroundings
- \*Shramadana work in digging a pit and burying garbage
- \*Exhibition to increase environmental awareness and information on fauna & flora
- \*Community awareness programmes in 5 Temples and for farmer groups in the area
- \*Field trip to Matale where the inspection of home gardens and their association with fauna
- \*Preparing and developing a brochure about Temple forest in the Sinhala language
- \*Receiving a grant of Rs 1 million from the Ministry of Environment & Forestry
- \*Camera donated by NSRC
- \*Slide and overheads donated by NSRC

## 1 Training programs / Community Awareness

- \*Entire village mapping of Manelwela village
- \*Analogue forestry workshops with farmers and priests
- \*Mapping of 36 home gardens in Manelwela area.
- \*Social mobilization towards analog forestry for farmers and priests
- \*Training workshop on nursery techniques with farmers and priests
- \*Workshop on soil, soil conservation methods and composting

## 8 Plants to be Incorporated in Landscape Design

*Acrocarpus fraxinifolius*  
*Albizia moluccana*  
*Aleurites triloba*  
*Alstonia scholaris*  
*Artocarpus alllthlis*  
*Callophyllum walkeri*  
*Cananga odorata*  
*Cedrella toona*  
*Erythrina lithosperma*  
*Girardinia maculata*  
*Litsea chinensis*  
*Michaelia champaca*  
*Michaelia mlagrica*  
*Macaranga tomentosa*  
*Myristica laurifolia*  
*Schizolobium parahyba*  
*Shorea gardeneri*  
*Inga edulis*  
**Orchids sp**  
*Eria tricolor*  
*Luisia teretifolia*  
*Vanda parviflora*  
*Papilionantus subulata*  
*Cymbidium ensifolium*  
*Cymbidium ensifolium bicolor*  
*Oberonia thwaitesii*

## 9 FLORAL CHECKLIST RECORDED IN PROJECT AREA

Common Name	Botanical Name	Common Name	Botanical Name
<b>BOMBACACEAE</b>		<b>VERBENACEAE</b>	
Katu-imbul	<i>Bombax malabaricum</i>	Milla	<i>Vitex pinnata</i>
<b>SOLONACEAE</b>		<b>RUBIACEAE</b>	
Cona Tibbotu	<i>Solanum indicum</i>	Wal Madata	<i>Rubia cordifolia</i>
Val Tibbotu	<i>Solanum indicum</i>	Pia	<i>Nauclea orientalis</i>
<b>STAPHYLEACEAE</b>		<b>LEGUMINOSAE</b>	
Welang	<i>Pterospermum suberifolium</i>	Koboleela	<i>Bauhinia tomentosa</i>
<b>DILLENACEAE</b>		Surrya mara	<i>Albizia odoratissima</i>
Godapara	<i>Dillenia retusa</i>	Kumburu wal	<i>Caesalpinia bonduc</i>
<b>CONVOLVULACEAE</b>		Katupila	<i>Tephrosia purpurea</i>
Apasumadu	<i>Paederia foetida</i>	Vadura Mae	<i>Mucuna pruriata</i>
		Karanda	<i>Pongamia pinnata</i>
		Keppettiya	<i>Crotolaria retusa</i>

<b>RUTACEAE</b>		<b>APOCYNACEAE</b>	
Yaknaran	<i>Atalantia ceylanica</i>	Araliya	<i>Plumeria obtusa</i>
Kudumiris	<i>Toddalia asiatica</i>	Divikaduru	<i>Pagantha dichotoma</i>
Ankenda	<i>Acronychia pedunculata</i>		
<b>NYMPHAEACEAE</b>		<b>ANNONACEAE</b>	
Abila	<i>Nymphaea stellata</i>	Aaththa	<i>Annona reticulata</i>
<b>MORACEAE</b>		<b>EUPHORBIACEAE</b>	
Ahatu	<i>Ficus tsela</i>	Kata kela	<i>Bridelia retusa</i>
Jak	<i>Artocarpus heterophyllus</i>		
Del	<i>Artocarpus altilis</i>	<b>COMPOSITAE</b>	
Budeliya	<i>Ficus exasperata</i>	Pupula	<i>Microglossa zelanica</i>
		<b>MELIACEAE</b>	
		Hulan hik	<i>Chukrasia tabularis</i>
<b>OLEACEAE</b>			
Bora	<i>Ligustrum robustum</i>		
<b>LAURACEAE</b>		<b>MANGOLIACEAE</b>	
Kadudawla	<i>Neolitsea fuscata</i>	Ginisapu	<i>Michelia champaca</i>
<b>SANTALACEAE</b>		<b>CAPPARIDACEAE</b>	
Suduhandun	<i>Santalum album</i>	Lunuwarana	<i>Crataeva adansonii</i>
<b>HIPPOCRATEACEAE</b>		<b>AMARYLLIDACEAE</b>	
Himoutu	<i>Salacia reticulata</i>	Wal-lumu	<i>Paucratum zeylanicum</i>
<b>ULMACEAE</b>		<b>COMBRETACEAE</b>	
Gedumba	<i>Trema orientale</i>	Kumbuk	<i>Terminalia arjuna</i>
<b>PALMAE</b>		<b>RHAMNACEAE</b>	
Kithul	<i>Caryota urens</i>	Masan	<i>Zizyphus jujuba</i>
<b>ANACARDIACEAE</b>		<b>GRAMINEAE</b>	
Badulla	<i>Semecarpus coriacea</i>	Bamboo	<i>Bambusa vulgaris</i>
Mango	<i>Mangifera indica</i>		
Bala	<i>Nothopegia beddomei</i>		
<b>MYRSINACEAE</b>		<b>SAPINDACEAE</b>	
Walagasal	<i>Embelia ribes burm</i>	Waralla	<i>Dodonaea viscosa</i>
Baludan	<i>Ardisia willisii</i>		
<b>GUTTIFERAE</b>			
Kokatiya	<i>Garcinia ternophylla</i>		
Keena	<i>Calophyllum walkeri</i>		
Na	<i>Mesua nagassarum</i>		

## 12 FAUNAL CHECKLIST RECORDED IN PROJECT AREA

### Birds

#### PARIDAE

Ceylon Grey Tit

*Parus major*

#### CORVIDAE

Black Crow

*Corvus splendens*

**SYLVIDAE**

Scimitar Babbler  
 Brown Capped Babbler \*  
 Black Fronted Babbler

*Pomatorhinus horsfieldii*  
*Pellorneum fuscicapillum*  
*Rhopocichla atriceps*

**PYCNONOTIDAE**

Red Vented Bulbul  
 Yellow Browed Bulbul  
 Black Bulbul

*Pycnonotus cafer*  
*Iole indica*  
*Hypsipetes leucocephalus*

**MUSCICAPIDAE**

Magpie Robin  
 Kashmir Red Breasted Flycatcher  
 Orange Breasted Blue Flycatcher  
 Dusky Blue Flycatcher  
 Brown Flycatcher  
 Grey Headed Flycatcher  
 Indian Blue Chat  
 Black Robin  
 Ceylon Shama

*Copsychus saularis*  
*Ficedula subrubra*  
*Cyornis tickelliae*  
*Eumyias sordida*  
*Muscicapa dauurica*  
*Culicicapa ceylonensis*  
*Luscinia brunnea*  
*Saxocoloides fulicata*  
*Copsychus malabaricus*

**MONARCHIDAE**

White browed Fantail Flycatcher

*Rhipidura aureola*

**SYLVIDAE**

Green Tree Warbler  
 Common Tailor Bird  
 White Throated Babbler

*Phylloscopus trochiloides*  
*Orthotomus sutorius*  
*Dumetia hyperythra*

**LANIDAE**

Brown Shrike

*Lanius cristatus cristatus*

**ORIOLIDAE**

Pied Shrike  
 Orange Minivet  
 Black Drongo  
 Black Headed Oriole  
 Black Headed cuckoo shrike

*Hemipus picatus*  
*Pericrocotus flammeus*  
  
*Oriolus xanthornus*  
*Coracina melanoptera*

**STURNIDAE**

Common Grackle

*Gracula religiosa*

**DASSERIDAE**

Grey Wagtail  
 Forest Wagtail

*Motacilla cinerea*  
*Dendronanthus indicus*

**NECTARINIDAE**

Lotens Sunbird  
 Purple Sunbird  
 Small Flowerpecker

*Nectarinia lotenia*  
*Nectarinia asiatica*  
*Dicaeum erythrorhynchos*

**MEGALAIMIDAE**

Brown Headed Barbet  
 Yellow Fronted Barbet

*Megalaima zelanica*  
*Megalaima flavifrons*

**DACELONIDAE**

White Breasted Kingfisher

*Halcyon smyrnensis*

**PSITTACIDAE**

Rose ringed Parakeet  
 Sri Lanka Lorikeet

*Psittacula krameri*  
*Loriculus beryllinus*

**ACCIPITRIDAE**

Serpent Eagle  
 Black Eagle

*Spilornis cheela*

**COLUMBIDAE**

Ceylon Wood Pigeon

*Columba torringtoni*

Spotted Dove

*Streptopelia chinensis***PHASIANIDAE**

Sri Lanka Jungle Fowl

*Gallus lafayetii***CISTICOLIDAE**

Ashy Prinia

*Prinia socialis***DICRURIDAE**

White vented Drongo

*Dicrurus caerulescens***PLOCEIDAE**

Baya Weaver

*Ploceus philippinus***PASSIERIDAE**

Spotted Munia

*Lonchura punctulata***HIRUNDINIDAE**

Hill Swallow

*Hirundo dumicolo***PICIDAE**

Yellow Naped Woodpecker

*Picus chlorolophus*

Red Backed Woodpecker

*Dinopium benghalense*

Indian Pipit

*Anthus rufulus passeridae***METOPIDAE**

Ceylon Green Bee Eater

*Merops orientalis*

Blue Tailed Bee Eater

*Merops philippinus***ALCEDINIDAE**

Three toed Kingfisher

*Ceyx erithacus***BUCEROTIDAE**

Sri Lanka Grey Hornbill

*Ocyrceros gingalensis***Reptiles****AGAMIDAE***Calotes versicolour**Calotes calotes**Calotes holepis**Otocryptis wiegmanni**Onemasois sp***SCINCIDAE***Sphenomorphus taprobanensis***Snakes****COLUBRIDAE***Oligodon sublineatus**Ptyas mucosus mucosus***VIPERIDAE***Hypnale hypnale**Trimeresurus trigonocephalus*

**Co-ordinator - Mr. Ajith Lokuge**

**Location - Intermediate Zone, Nikapota**

**1 Total number of Farmers**

Number of Male Farmers - 68  
Number of Female Farmers - 5  
- 73

**2 Existent and Potential Forest Garden Crops**

**Perennials**

<b>Common Name</b>	<b>Botanical Name</b>	<b>Uses</b>
Banana	<i>Musa acuminata</i>	Fruit
Breadfruit	<i>Artocarpus altilis</i>	Fruit
Passion Fruit	<i>Passiflora edulis</i>	Fruit
Papaw	<i>Carica papaya</i>	Fruit
Pineapple	<i>Ananas comosus</i>	Fruit
Veralu	<i>Elaeocarpus serratus</i>	Fruit
Goraka	<i>Garcinia cambogia</i>	Fruit
Passion Fruit	<i>Passiflora edulis</i>	Fruit
Jak	<i>Artocarpus heterophyllus</i>	Fruit/vegetable
Mango	<i>Mangifera indica</i>	Fruit
Lime	<i>Citrus aurantifolia</i>	Fruit
Sugar cane	<i>Saccharum officinarum</i>	Sugar
Cocoa	<i>Theobroma cacao</i>	Beverage
Coffee	<i>Coffea robusta</i>	Beverage
Pepper	<i>Piper nigrum</i>	Spice
Cinnamon	<i>Cinnamomum zeylanicum</i>	Spice
Nelli	<i>Phyllanthus embelica</i>	Medicine
Aralu	<i>Terminalia chebula</i>	Medicine
Bulu	<i>Terminalia belerica</i>	Medicine
Turmeric	<i>Curcuma domestica</i>	Seasoning
Ginger	<i>Zingiber officinale</i>	Seasoning
Gammalu	<i>Pterocarpus marsupium</i>	Resin
Arecanut	<i>Areca catechu</i>	Masticatory
Coconut	<i>Cocos nucifera</i>	Nut
Ash plantain	<i>Musa sp</i>	Vegetable
Tibbotu	<i>Solanum indicum</i>	Vegetable
Talana batu	<i>Solanum sp</i>	Vegetable
Spinach	<i>Basella alba</i>	Leafy vegetable
Winged Beans	<i>Psophocarpus tetragonolobus</i>	Vegetable
Snake Gourd	<i>Trichosanthes anguina</i>	Vegetable
Okra	<i>Hibiscus esculentus</i>	Vegetable
Kohila	<i>Lasia spinosa</i>	Leafy vegetable
Brinjal	<i>Solanum melongena</i>	Vegetable

**3 Total land covered - 157 ¼ Acres ( extent of the whole area)**

**4 Total monthly income of 73 farmer families - Rs 138,400 00**

## 5 Summary of Activities

### December 1997

The basic activities carried out were

\*Area Survey to recognize eco-geographic and socio- geographic zones of the area

\*Sociological surveys and involvement with villages

\*Ecological surveys

The survey at Nikapota covered an area having a diameter of around 7 kms to either direction along the main road. The geological studies revealed the high earth slide prone nature of the area. Vegetation surveys showed that a fair extent consisted of rich home gardens and natural, tree dominant vegetation. There are no urban areas within this range.

Studies done at home gardens showed that

Though the vegetation appeared to be mature or good, the soil is in a poor state. Poor socio-economic conditions exist so much so that village youth move out in search of jobs. The main livelihood so far has been paddy and sugar cane cultivation. Paddy farming has been a failure. Sugar cane farming is a way of sustaining villagers on a day to day basis, since they can harvest small quantities of sugar cane every day, process and selling it daily. This barely meets their daily expenses.

Some villages receive an additional income by selling forest products such as the medicinal creeper *Coscinum fenestratum* an edible berry *Phyllanthus embilica* and Goraka *Garcinia cambogia* a fruit.

Some home gardens exist in the area where a fairly high bio-diversity consisting of species such as the Bird Wing Butterfly and the Ceylon Shama can be seen.

Ecological surveys were carried out using a draft field form.

### January / February 1998

The activities carried out included the continuation of the surveys to

\*Recognize and map vegetation types of the area

\*Management plans to design anthropogenic landscapes

\*Identify and list biotic components and their inter-relations

Several areas which had been previously identified as natural were actually anthropogenic vegetation or a mix of the two. Vegetation maps were updated accordingly. Close examination of the vegetation map / area map showed an interesting feature, the project site, Akkara Siyaya of Nikapota is the entry point to the natural vegetation, and it is to this village location only that a road goes down to. This location serves as the interface between the village cluster in the area and the 'civilized world'. For instance, all the lorries that transport items and materials in and out of the area stop here, and subsequently, many commercial ventures – legal and illegal are taking place.

#### **Ecological Surveys**

We came across several interesting species such as Blue face Malkoha, a *Cabrita* sp and a small plant that may relate to Cactus. We observed that several species such as sambour and elephant live alone in this area. This is probably an adaptive mechanism developed by them to minimize the impact by people on them. A solitary elephant (wild) was followed so as to study the behavior of this species and this particular individual. This is the main crop pest for the people of this area, so it is important to study his behavioural pattern.

#### **Management of anthropogenic eco-system in the Area**

Village home garden studies revealed the crop species, the natural flora and fauna present. Most village gardens are ill-managed and ill-planned. For instance, village gardens do not have many crop species that yield during the dry season.

An array of birds and butterflies occur in the home gardens and fringe vegetation. Butterflies seem attracted (apparently) to the wetness found in home gardens.

The vegetation structure of some home gardens have a dense, rich under-story, which provides a home to many interesting species.

There exists no village mechanism that supports or promotes the conservation of the environment in the area. Instead, many activities are taking place that destroy natural resources. Some examples are felling trees for timber, and harvesting medicinal plants such as *Coscinum fenestratum* which activities are taking place at an alarming rate. At least, one lorry load of each item leaves the village per week, and around thirty families of the area live off these two actions.

However, the harvesting of *Phyllanthus embelica*, and mining of sand are two examples of actions that take place in a sustainable manner. The sand mining done here does not have a devastating effect on the environment. This is due to the fact that the river that flows through the village is silt laden after many land – slides that have taken place above the valley

#### **Villages, and Total Eco-system Management.**

We are developing a mechanism to manage and conserve the existing ecosystems of this project site with the involvement of villagers and have conducted formal meetings with relevant government officers in order to obtain the necessary permission to do so. Several officers of village organisations such as the Village Welfare organisation, and the Farmer Organisation did not support us initially. Later on we found that it is these officers who are behind the illegal timber industry of the area (The same four characters are officials of all the village organisations). Villagers, who are not the office bearers, but members, are supporting our conservation efforts, and they are not in alliance with office bearers of their village organisations. We forced the officers of the village welfare society to allow us to address the members of the welfare organisation at their last meeting. We were allocated five minutes at first, and then members forced the committee of officers to allow us ten minutes more. In addition friendly discussions with the Buddhist priests in the village have lead put us in good stead with the community. We captured a lorry load of illegal timber with the help of some village youth.

#### **February / March 1998**

##### **Public Meeting with Villagers**

A meeting was held on 25<sup>th</sup> February where more than 30 Male farmers, 30 female farmers and two village government representatives called 'Grama Sevaka's (GSs) participated. The meeting was held to introduce ourselves, and to discuss our activities with the villagers. The two GSs also addressed the crowd expressing their appreciation towards our work, and requesting the fullest support of villagers.

##### **Meeting with Government Officers**

We met several officers this month regarding our future work plan for the area. One main activity will be to put up educational boards at a famous – tour site – The Dyaluma Wall Fall.

##### **Sociological survey, Ecological survey and Mapping of the Home Garden plots**

Visited village home gardens in order to map those gardens and gather sociological information. This session of visits helped us to gain more knowledge about the socio – economic structure of the village. Whilst a team of project members attended to the sociological interview, another set of project team members attended to the gathering of environmental data. On several occasions village children joined us in observing birds and helped us in identifying tree species in their home gardens.

##### **Designing Landscapes in potential forest gardens**

We have identified several possible forest garden products which are already present, and more crop species that could be introduced to the area. Some such crops are Wood apple, Nutmeg and Rambutan. We intend to incorporate these Analog Forest candidates in the design of Forest Gardens in the area. These crops are good sources of income. Several crucial components are to be incorporated to the management plan such as animal husbandry and crops that are not preferred by elephants. Villagers in are exhausted after several repetitive crop failures caused by the elephant. Whilst there are many crop pests such as the torque monkey, the giant squirrel, and the porcupine, the elephant is the worst.

##### **Forest Garden Products,(FGPs)**

Studied the present status of the village and villagers in relation to the FGP activity. We found that there are crop species with a high financial potential and which fall within the FGP framework. Where adequate crop output would be enough to start small-scale FGP marketing,, transport facilities are hard to arrange.

##### **Continuation of field research and school awareness programmes**

Field research is being done to study the functions of crop and other tree species, and their interactions with fauna. This information is vital to the application of analog forestry. Comparative studies of home garden crops with forest species in the performance of ecological functions is a continuous field of research, for instance, if the same type of pollinators visit two species of trees under investigation, do the same type of birds also roost, perch, feed and nest on these same species, etc. Much data has been gathered for different vegetation areas and more than a hundred field forms have been filled.

The last two weeks of March were spent mainly for conducting school awareness programs. Visited six schools and established official contacts. Then we held awareness programs – a slide show and a lecture at each school. Subsequently, medicinal plants have been distributed to each school.

#### April / May 1998

We set up information billboards on environmental conservation at a nature tourist attraction in the area – the Diyuluma waterfall. Eight village children between the ages of 7 – 12 years joined us in this action and the garbage cleaning activity that followed. The Government Divisional Secretariat contributed by providing four labourers to dig two garbage pits. The Divisional Secretarial Office promised to dispose garbage twice weekly.

We initiated a tuition class to promote the knowledge of English to the village students. Presently the number of students enrolled is 18.

Began the landscaping of the village gardens according to the plans formulated. Initial activity was to plant Ginger. The landscaping of home gardens will commence by planting one or two crop plants at a time during the dry season. At the same time we have delivered polythene tubing to homes, and after discussing with the land owner of each plot, decided what should be planted using these packets.

School educational programs have progressed such that five schools are involved as the 'core group' and several other schools are to be included to the program. An environmental "group" has been formed in each core group school.

#### **Present marketing trends**

Carried out a series of dialogues with farmers so as to understand the way in which they presently marketed their crops. Village produce is taken once a week to the fair at the town nearest – Haputale. It is around 24 kilometres off the main collecting centre of the village Akkara Siyaya. The fair is on a Sunday. Items are transported to the town, late Saturday or very early on Sunday. All members of a family take part in hand carrying, their produce to the fair, but it most often the womenfolk who do the selling. Villagers receive a higher value for their products if they sell it retail, though the process takes their full day. In contrast, they can save the day for other activities if they sell their products whole sale to a price of around 80% the retail price. Many prefer to sell retail. Prices received by villagers for their home garden products is about 70% the Colombo market price.

Investigated the effect of sand mining, as the activity is more aggressive now since the earth-slip took place. The earth slip area lies upstream to the project site, and the dislodged soil and water gravitate down to the river flowing through the project site. The river thus is heavily silted, laden with sand and silt for about 1.5 meters. Many aquatic animals recorded before have not been seen hence, fish in particular. Now not a single fish lives and habitats of the aquatic creatures are buried. Ironically, we think that recovery of buried habitats could occur from this sand mining activity.

#### **Ecological Research**

More field studies were done at village home gardens and at several selected natural forest habitats. The team has visited the following areas in the past seven weeks:

Bambarakanda Forest (riverine, montane, rain forest and semi-cloud forest habitats) – 02 field visits,

Dombagaskanda forest (low country, rain forest)

Uduhawara forest (Intermediate Zone)

Tangamalai Forest Reserve (cloud forest / up country rain forest), and

Metihakka area – (scattered Savannah and bush forest blending into evergreens and / or rich home gardens)

Our research thus far has focused on bird life in relation to different tree species. We have now started studying about insects in relations to trees.

#### **Environmental Exhibition**

The last three days of May has been a very busy time for the Nikapota project team. We held a three day, environmental exhibition at the center school of the project site Nikapota.

Government Officials of the area extended their fullest co-operation and the School authorities gave a holiday on the first day (a Friday) of exhibition. The other schools in the area were given permission to divert from their regular activities and visit the exhibition. Several other organizations participated in the exhibition who were The National Zoological Gardens, the Sri Lanka Customs, several environmental NGOs –the Nature Foundation, the Nature Conservation Group, the Turtle Conservation Project and the Young Zoologists Association.

The NSRC, Nikapota team maintained several stalls – one displaying ornamental fish, another reptiles, another one showing interesting environmental photographs and a special stall displaying sustainable land management and total ecosystem management – theory and application

There were around thirty live specimens of reptiles – snakes, a small crocodile, and tortoises. The main attractions of the exhibition were the reptile stall and the screening of environmental films, mostly related to Sri Lanka. Further, members of the environmental groups of village schools who showed the greatest amount of promise received several posters on reptiles or fishes as a reward.

## 6. Training Programs / Community Activities

- Public Meetings - 2
- School Awareness Programs - 12 (approximately)
- Three day Exhibition - 1
- Door to door awareness for farmers, covering 72 farmers - villagers were visited 8 times  
Create an awareness about Sustainable land management, From a chena (slash/burn plot) to an Analog Forest
- The progress review meeting held at Nikapota – Waralkanatte
- Training on Nursery and Composting, (done door to door)
- Village tuition classes – English - 4 classes a week for four groups,
- Village tuition classes – Mathematics- O/L students, 10 classes held

## 7. Plants that are to be incorporated in Landscape design

Common Name	Botanical Name
Cashew	<i>Anacardium occidentale</i>
Rambutan	<i>Nephelium lappaceum</i>
Avacado	<i>Persea americana</i>
Katurumurunga	<i>Sesbama grandiflora</i>
Ebony	<i>Diospyrus eboneum</i>
Mahogany	<i>Swietenia mahagoni</i>
Halmulla	<i>Berrya cordifolia</i>
Satinwood	<i>Chloroxylon swietenia</i>
Cardamom	<i>Ellettaria repens</i>
Sandalwood	<i>Santalum album</i>
Durian	<i>Durio zibethinus</i>
Cloves	<i>Syzygium aromaticum</i>
Grevilia	<i>Grevillea robusta</i>
Tree tomato	<i>Cyphomandra betaceae</i>
Orange	<i>Citrus aurantium</i>
Mandarin	<i>Citrus nobilis</i>
Vanilla	<i>Vanilla planifolia</i>
Green Sapotae	<i>Lucuma viridae</i>
Lemon	<i>Citrus limon</i>
Nutmeg	<i>Myristica fragrans</i>
Mangosteen	<i>Garcinia mangostana</i>
Ice Cream Bean	<i>Inga edulis</i>

## 8 FLORAL CHECKLIST OF THE NIKAPOTA AREA

Common Name	Botanical Name	Common Name	Botanical Name
<b>MORACEAE</b>		<b>RUTACEAE</b>	
Jak	<i>Artocarpus heterophyllus</i>	Jambola	<i>Citrus grandis</i>
Del	<i>Artocarpus altilis</i>	Curry leaf	<i>Murraya koenigii</i>
		Lime	<i>Citrus aurantifolia</i>
		Satin wood	<i>Chloroxylon swietenia</i>
<b>MYRTACEAE</b>		Mandarine	<i>Citrus nobilis</i>
Clove	<i>Syzygium aromaticum</i>	Wood apple	<i>Feronia elephanta</i>
Damba	<i>Syzygium assimile</i>	Orange	<i>Citrus aurantium</i>
Gauva	<i>Psidium guajava</i>	Beli	<i>Aegle marmelos</i>
		Lemon	<i>Citrus limon</i>
<b>MALVACEAE</b>		<b>GRAMINEAE</b>	
Suriya	<i>Thespesia populnea</i>	Banana	<i>Musa acuminata</i>
<b>CYCADACEAE</b>		Sugar Cane	<i>Saccharum officinarum</i>
Madu	<i>Cycas circinalis</i>		
<b>LAURACEAE</b>		<b>MELIACEAE</b>	
Avacado	<i>Persea americana</i>	Neam	<i>Azadirachta indica</i>
Kadudawla	<i>Neolitsea cassia</i>	Lunumidella	<i>Melia azedarach</i>
Cinnamon	<i>Cinnamomum zeylanicum</i>	Mahogany	<i>Swietenia mahagoni</i>
		<b>RUBIACEAE</b>	
<b>VERBENACEAE</b>		Kolon	<i>Adina cordifolia</i>
Teak	<i>Tectona grandis</i>	Coffee	<i>Coffea robusta</i>
<b>ANNONACEAE</b>		<b>PIPERACEAE</b>	
Aatha	<i>Annona muricata</i>	Pepper	<i>Piper nigrum</i>
<b>CELASTRACEAE</b>		<b>STERCULIACEAE</b>	
Neralu	<i>Eleodendron glaucum</i>	Welang	<i>Pterospermum suberifolium</i>
<b>ANACARDIACEAE</b>		<b>ELAEOCARPACEAE</b>	
Mango	<i>Mangifera indica</i>	Weralu	<i>Elaeocarpus serratus</i>
Badulla	<i>Semecarpus gardneri</i>		
Cashew	<i>Anacardium occidentale</i>	<b>EUPHORBIACEAE</b>	
<b>LEGUMINOSAE</b>		Neli	<i>Phyllanthus embelica</i>
Tamarind	<i>Tamarindus indica</i>	Bukenda	<i>Mallotus albus</i>
Katurumurunga	<i>Sesbama grandiflora</i>	Kenda	<i>Macaranga peltata</i>
Kahakona	<i>Cassia spectabilis</i>	Murunga	<i>Moringa oleifera</i>
Mara	<i>Albizia lebbek</i>		

**PALMAE**

Cocunut *Cocos nucifera*  
 Kitul *Caryota urens*  
 Puwak *Areca catechu*

**SAPINDACEAE**

Rambutan *Nephelium lappaceum*

**COMBRETACEAE**

Dawu *Anogeissus latifolia*  
 Bulu *Terminalia belerica*

**AGAVACEAE**

Dracaena *Dracaena fragrans*

**SOLANACEAE**

Tibbotu *Solanum indicum*

**EBENACEAE**

Kalumederya *Diospyros oppositifolia*  
 Kaluwella *Diospyros racemosa*

**TILIACEAE**

Damunmya *Grewia damine*

**SAPOTACEAE**

Lawalu *Chrysophyllum roxburghii*

**FLACOURTIACEAE**

Makulu *Hydnocarpus venenata*  
 Uguressa *Flacourtia ramontchi*

**PROTEACEAE**

Silky oak *Grevillea robusta*

**BROMELIACEAE**

Pineapple *Ananas comosus*

**VERBENACEAE**

Milla *Vitex pinnata*

**CARICACEAE**

Papaya *Carica papaya*

**GUTTIFERAE**

Goraka *Garcinia cambogia*

**BOMBACACEAE**

Kotta pulun *Ceiba pentandra*

**STERCULIACEAE**

Cocoa *Theobroma cacao*

**PUNICACEAE**

Delum *Punica granatum*

**ULMACEAE**

Gedumba *Trema orientale*

**9 Faunal Check-list****REPTILES****Snakes****TYPHLOPIDAE**

*Ramphoryphops braminus*

**UROPELTIDAE**

*Rhinophis punctatus*

**COLUBRIDAE**

*Elaphe helena*

*Lycodon aulicus*

*Marcropisthodon plumbicolor*

*Ptyas mucosus*

*Dendrelaphis tristis*

*Dendrelaphis bifrenalis*

*Ahaetulla nasutus*

*Ahaetulla pulverulenus*

*Amphiesma stolata*

*Atretium schistosum*

*Oligodon taemolatus*

*Oligodon sublineatus*

*Liopelepis claamaria*

*Xenochrophis piscator*

**ELAPIDAE**

*Naja Naja*

**VIPERIDAE**

*Vipera russelli*

*Hypanale hypanale*

*Trimeresurus trigonocephalus*

**TETRAPODS**

**GEKKONIDAE**

*Hemidactylus brooki*

*Hemidactylus depressus*

*Hemidactylus maculatus*

*Gehyra mutilata*

*Cnemaspis kandiana*

*Gekhola triedrus*

**VARANIDAE**

*Varanus salvator*

*Varanus cepedianus*

**LACERTIDAE**

*Cabrita leschenaulti*

**AGAMIDAE**

*Calotes calotes*

*Calotes ceylonensis*

*Calotes versicolor*

*Lyricephalus scutatus*

*Otocryptis wegmanni*

**SCINCIDAE**

*Mabuya carinata*

*Mabuya macularia*

**Amphibians**

**BUFONIDAE**

*Bufo kelaarti*

*Bufo melanostictus*

**ICYTHIOPHYDAE**

*Ichthyophis sp*

**RANIDAE**

*Rana temporalis*

*Euphlyctis cyanophlyctis*

*Limnonectes corrugatus*

*Limnonectes limnocharis*

**RHACOPHORIDAE**

*Polypedates cruciger*

*Polypedates sp (G)*

*Philautus sp (a)*

*Philautus sp*

## Butterflies

<i>Common name</i>	<i>Zoological Name</i>	<i>Common Name</i>	<i>Zoological Name</i>
<b>DANAIDAE</b>		<b>RIODINIDAE</b>	
Ceylon Tree Nymph	<i>Idea jasonia</i>	Plum Judy	<i>Abisara echirius</i>
Blue Tiger	<i>Tirumala limniaceae</i>	<b>LYCAENIDAE</b>	
Glassy Tiger	<i>Parantica aglea</i>	Red Pierrot	<i>Talicauda nyseus</i>
Common Tiger	<i>Danaus genutia</i>	Angled Pierrot	<i>Caleta decidia</i>
Plain Tiger	<i>Danaus chrysippus</i>	<b>PIERIDAE</b>	
Common Indian Crow	<i>Euploea core</i>	Psyche	<i>Leptostia nina</i>
Pale Ceylon 6 line blue	<i>Nacaduba snhala</i>	Crazy Jezebel	<i>Delias eucharis</i>
Common cerulean	<i>Jamides celeno</i>	Common Gull	<i>Cepora nerissa</i>
Yamfly	<i>Loxura atymnus</i>	Lesser Albatross	<i>Appias paulina</i>
Lime Blue	<i>Chilades lajus</i>	Common Albatross	<i>Appias albira</i>
<b>SATYRIDAE</b>		Lemon Migrant	<i>Catopsilia pomona</i>
Common Bush Brown	<i>Mycalesis perseus</i>	Small Grass Yellow	<i>Eurema brigitta</i>
Gladeye Bush Brown*	<i>Nissanga patna</i>	Common Grass Yellow	<i>Eurema hecabe</i>
White Four ring	<i>Ypthima ceylonica</i>	Three Spot Grass Yellow	<i>Eurema blanda</i>
Nigger	<i>Orsotriaena medus</i>	Great Orange Tip	<i>Hebomoia glaucippe</i>
Common Evening Brown	<i>Melanitis leda</i>	Dark Wanderer	<i>Pareronia ceylanica</i>
Common Palmfly	<i>Elymnias hypermnestra</i>	<b>PAPILIONIDAE</b>	
<b>NYMPHALIDAE</b>		Crimson Rose	<i>Pachlopta hector</i>
Tawny Raja	<i>Charaxes psaphon</i>	Blue Mormon	<i>Papilio polymnestor</i>
Common Nawab	<i>Polyura athamas</i>	Common Mormon	<i>Papilio polytes</i>
Baronet	<i>Symphaedra nais</i>	Lime Butterfly	<i>Papilio demoleus</i>
Commander *	<i>Moduza procris</i>	Common Blue Bottle	<i>Graphium sarpedon</i>
Clipper *	<i>Parthenos sylvia</i>	Common Jay	<i>Graphium doson</i>
Common Sailor	<i>Neptis hylas</i>	Tailed Jay	<i>Graphium agamemnon</i>
Common Lascar	<i>Pantoporia hordonia</i>	Common Birdwing	<i>Troides darsius</i>
Danaid Egg fly	<i>Hypolimnas misippus</i>	<b>HESPERIDAE</b>	
Great Egg fly	<i>Hypolimnas bolina</i>	Common Grass Dart	<i>Taractrocera maevius</i>
Blue Oak Leaf *	<i>Kallima philarchus</i>	Branded Orange Awlet	<i>Bibasis oedipodea</i>
Peacock Pansy	<i>Junonia almana</i>		-
Grey Pansy	<i>Junonia atlites</i>		
Chocolate Soldier	<i>Junonia iphita</i>		
Blue Admiral	<i>Kamiska canace</i>		
Common Leopard	<i>Phalanta phalantha</i>		
Rustic	<i>Cupha erymanthis</i>		
Tamil Lace wing *	<i>Cethosia nietneri</i>		
Angled Castor	<i>Ariadne ariadnea</i>		
Common Castor	<i>Ariadne merione</i>		
Tawny Castor	<i>Telchinia violae</i>		
Gaudy Baron	<i>Euthalia lubentina</i>		
Baron	<i>Euthalia aconthea</i>		

## Fresh-Water Fish

### CYPRINIDAE

*Tor khudree*  
*Garra ceylonensis*  
*Puntius dorsalis*  
*Puntius filamentosus*  
*Puntius amphibius*  
*Puntias bimaculatus*  
*Rasbora daniconius*  
*Danio malabaricus*

### COBOTTIDAE

*Lepidocephalichthys thermalis*

### BALITORIDAE

*Schistura notostigma*

### BELONTIDAE

*Belontia signata*

### CHANNIDAE

*Channa sp*

## Birds

### CORVIDAE

Village Crow

*Corvus splendens*

### PARIDAE

Ceylon Grey Tit

*Parus major*

Velvet Fronted Blue Nut hatch

*Sitta frontalis*

### SYLVIIDAE

Ceylon White throated Babbler

*Dumetia hyperythra*

Ceylon Yellow eyed Babbler

*Chrysomma sinense*

Brown Capped Babbler \*

*Pellorneum fuscicapillum*

Black Fronted Babbler

*Rhopocichla atriceps*

Ceylon Iora

*Aegithina tiphia*

Jerdon's chloropsis

*Chloropsis cochinchinensis*

Common Babbler

*Turdoides affinis*

Ceylon Scimitar Babbler

*Pomatorhinus horsfieldii*

Green Tree Warbler

*Phylloscopus trochiloides*

Large Billed Tree Warbler

*Phylloscopus magnirostris*

Common Tailor Bird

*Orthotomus sutorius*

### PITTIDAE

Indian Pitta

*Pitta brachyura*

**PYCNONOTIDAE**

Red vented Bulbul  
 Yellow Browed Bulbul  
 White Browed Bulbul  
 Black Capped Bulbul \*  
 Black Bul bul

*Pycnonotus cafer*  
*Iole indica*  
*Pycnonotus luteolus*  
*Pycnonotus melamcterus*  
*Hypsipetes leucocephalus*

**MUSCICAPIDAE**

Indian Blue Chat  
 Black Robin  
 Southern Magpie Robin  
 Ceylon Shama  
 Pied Ground Thrush  
 Orange Breasted Blue Fly Catcher  
 Brown Fly Catcher  
 Grey Headed Fly Catcher

*Luscinia brunnea*  
*Saxicoloides fulvicata*  
*Copsychus saularis*  
*Copsychus malabaricus*  
*Zoothera wardi*  
*Cyornis tickelliae*  
*Muscicapa dauurica*  
*Culicicapa ceylonensis*

**MONARCHIDAE**

Paradise Fly Catcher  
 Azure Blue Fly Catcher  
 White Browed Fantail Fly Catcher

*Terpsiphone paradisi*  
*Hypothymis azurea*  
*Rhipidura aureola*

**CISTICOLIDAE**

Ashy Prina

*Prinia socialis*

**LANIDAE**

Brown Shrike

*Lanius cristatus cristatus*

**ORIIDAE**

Pied Shrike  
 Black Headed Cuckoo Shrike  
 Ceylon Wood Shrike  
 Large Cuckoo Shrike  
 Orange Minivet  
 Little Minivet  
 Black Headed Oriole

*Hemipus picatus*  
*Coracina melanoptera*  
*Tephrodornis pondicerianus*  
*Coracina macei*  
*Pericrocotus flammeus*  
*Pericrocotus cinnamomeus*  
*Oriolus xanthornus*

**STURNIDAE**

Common Grackle  
 Common Mynah

*Gracula religiosa*  
*Acridotheres tristis*

**DICRURIDAE**

Black Drongo

*Dicrurus macrocercus*

**DASSERIDAE**

White Backed Munia  
 Spotted Munia  
 House Sparrow  
 Indian Pipit  
 Grey Wagtail

*Lonchura striata*  
*Lonchura punctulata*  
*Passer domesticus*  
*Anthus rufulus*  
*Motacilla cinerea*

**HIRUNDINIDAE**

Common Swallow  
 Ceylon Shallow

*Hirundo rustica*  
*Hirundo sp*

**ZOSTEROPIDAE**

Ceylon Small White Eye

*Zosterops palpebrosus*

**NECTARINIIDAE**

Loten's Sunbird  
 Purple Sunbird  
 Purple Rumped Sunbird  
 Small Flower Pecker  
 Thick Billed Flower Pecker

*Nectarinia lotenia*  
*Nectarinia asiatica*  
*Nectarinia zeylonica*  
*Dicaeum erythrorhynchus*  
*Dicaeum agile*

**PICIDAE**

Small Scaly Bellied Green Woodpecker	<i>Picus xanthopygoeus</i>
Yellow Naped Wood Pecker	<i>Picus chlorolophus</i>
Yellow Fronted Pied Wood Pecker	<i>Dendrocopus mahrattensis</i>
Pigmy Wood Pecker	<i>Dendrocopus nanus</i>
Rufus Wood Pecker	<i>Celeus brachyurus</i>
Red Backed Wood Pecker	<i>Dinopium benghalense</i>

**MEGALAIMIDAE**

Brown Headed Barbet	<i>Megalaima zeylanica</i>
Yellow Fronted Barbet	<i>Megalaima flavifrons</i>
Crimson Breasted Barbet	<i>Megalaima haemacephala</i>
Sri Lanka Small Barbet	<i>Megalaima rubricapilla</i>

**CORACIIDAE**

Indian Roller	<i>Coracias benghalensis</i>
---------------	------------------------------

**METOPIDAE**

Ceylon Green Bee Eater	<i>Merops orientalis</i>
Chestnut headed Bee Eater	<i>Merops leschenaulti</i>

**ALCEDINIDAE**

Common Kingfisher	<i>Alcedo atthis</i>
Three toed Kingfisher	<i>Ceyx erithacus</i>

**DACELONIDAE**

White Breasted Kingfisher	<i>Halcyon smyrnensis</i>
---------------------------	---------------------------

**BUCEROTIDAE**

Sri Lanka Grey Hornbill	<i>Ocyrceros gingalensis</i>
-------------------------	------------------------------

**CENTROPODIDAE**

Palm Swift	<i>Cypsiurus balasienis</i>
Edible Nest Swift	<i>Collocalia unicolor</i>

**HEMIPROCNIIDAE**

Crested Swift	<i>Hemiprocne coronata</i>
Southern Common Indian Nightjar	<i>Caprimulgus asiaticus</i>

**BATAHOSTOMIDAE**

Frog Mouth	<i>Batrachostomus monieher</i>
------------	--------------------------------

**TROGONIDAE**

Trogon	<i>Harpactes fasciatus</i>
--------	----------------------------

**CUCULIDAE**

Blue-faced Malkoha	<i>Phaenicophaeus viridirostris</i>
--------------------	-------------------------------------

**CENTROPODIDAE**

Common Coucal	<i>Centropus sinensis</i>
---------------	---------------------------

**PSITTACIDAE**

Blossom-headed Parakeet	<i>Psittacula cyanocephala</i>
Layard's Parakeet	<i>Psittacula calthropae</i>
Sri Lanka Lorikeet	<i>Loriculus beryllinus</i>

**ACCIPITRIDAE**

Ceylon Crested Hawk Eagle	<i>Spizaetus cirrhatus</i>
Serpent Eagle	<i>Spilornis cheela</i>
White-bellied Sea Eagle	<i>Haliaeetus leucogaster</i>
Black-winged kite	<i>Elanus caeruleus</i>
Black Eagle	<i>Ictinaetus malayensis</i>

**COLUMBIDAE**

Pompadour green pigeon	<i>Treron pompadora</i>
Bronze wing pigeon	<i>Chalcophaps indica</i>
Spotted Dove	<i>Streptopelia chinensis</i>
Green Imperial Pigeon	<i>Ducula aenea</i>

**PHASIANIDAE**

Jungle Bush Quail  
Sri Lanka Jungle Fowl  
Sri Lanka Spur Fowl  
Red-wattle Lapwing  
White breasted water hen

*Perdicula asiatica*  
*Gallus lafayetii*  
*Galloperdix bicalcarata*  
*Venellus indicus*  
*Amaurornis phoenicurus*

**ARDEIDAE**

Pond Heron  
Cattle Egret

*Ardeola grayii*  
*Bubulcus ibis*

**10 Matching Activities**

Further to the 7 full time officers, 4 regular volunteers serve the project. They are trained field naturalists, and are presently serving to gather ecological information related with analog forestry. Furthermore, volunteers provide occasional assistance.

The team usually work till very late in the night, and weekends and other holidays are treated as normal working days. No overtime charges are claimed for these duties.

The Nikapota project team also provides free consultancy to other units of the Forest Garden Project.

Per diems for project officers when on field visits are borne by themselves.

The Project constantly hires 4 push cycles, 4 cameras, 4 binoculars & other field equipment which are necessary for the project.

The type of project activities of the Nikapota team engages in has a risk factor by way of sicknesses and injuries. The cost of medical expenses and the cost of life insurance is borne by the project officers.

Water and electricity have been provided to the project free of charge for the first 6 months. The Nikapota project unit is using 3 telephones, 1 Fax Machine, 3 Computers.

The land for the site office & nursery as well as the cost of construction is provided free to the Project.

The following activities were carried out at no extra cost to the donor agency –  
The awareness creation at Diyaluma and the infra-structural materials for the exhibition.

With regard to the village nurseries, the labour costs, tools, materials other than polythene are being provided by farmers and project officers.

A weekly tuition class and school awareness programs are held at no extra cost to the Project, including the hire of 2 slide projectors.

**Co-ordinator: Mr. William W. Gamage**  
**(National Forum for People's Organisations - NFPO)**  
**Location – Wet Zone, Haldola & Bopatta Villages in Ratnapura District**

**1 Total number of farmers and farmer families**

		<u>Haldola</u>	<u>Bopatta</u>
Families	-	25	25
Males	-	81	55
Females	-	63	50
<b>Total</b>	-	<b>144</b>	<b>105</b>

**2 Existent and Potential Forest Garden Products**

<b>Common Name</b>	<b>Botanical Name</b>	<b>Use</b>
Mangosteen	<i>Garcinia mangostana</i>	Fruit
Sweet Orange	<i>Citrus sinensis</i>	Fruit
Lemon	<i>Citrus limon</i>	Fruit
Gaduguda	<i>Baccaurea motleyana</i>	Fruit
Rambutan	<i>Nephelium lappaceum</i>	Fruit
Avacado	<i>Persea americana</i>	Fruit
Jak	<i>Artocarpus hetrophyllus</i>	Fruit
Goraka	<i>Garcinia cambogia</i>	Fruit
Nam-nam	<i>Cynometra cauliflora</i>	Fruit
Mango	<i>Mangifera indica</i>	Fruit
Hal	<i>Vateria acuminata</i>	Fruit
Passion fruit	<i>Passiflora edulis</i>	Fruit
Papaw	<i>Carica papaya</i>	Fruit
Guava	<i>Psidium guajava</i>	Fruit
Durian	<i>Durio zibenthus</i>	Fruit
Banana	<i>Musa acuminata</i>	Fruit
Ambarella	<i>Spondias dulcis</i>	Fruit
Jambu	<i>Syzygium jambos</i>	Fruit
Betel	<i>Piper betle</i>	Masticatory
Katurumurunga	<i>Sesbania grandiflora</i>	Leafy Vegetable
Suduhandum	<i>Santalum album</i>	Medicine
Cardomon	<i>Elettaria repens</i>	Spice
Cinnamon	<i>Cinnamomum verum</i>	Spice
Pepper	<i>Piper nigrum</i>	Spice
Tea	<i>Camellia thea</i>	Beverage
Coffee	<i>Coffea arabica/robusta</i>	Beverage
Kitul treacle	<i>Caryota urens</i>	
Kitul juggery	"	

**3 Total land covered**

Haldola	-	33 5 Acres
Bopatta	-	39 5 Acres
<b>Total</b>	-	<b>73 Acres</b>

#### 4 Monthly Income

Average monthly income was Rs 3000 00 per month before the project started. After introducing income generation activities such as vegetable cultivation, seed collecting programmes, ginger and turmeric cultivation and plant nursery development, the average monthly income of the two villages has increased from Rs 3000/- to Rs 3500/-

#### 5 Plants in Office Nursery

Common Name	Botanical Name
Kitul	<i>Caryota urens</i>
Pihumbiya	<i>Filicium decipiens</i>
Beli	<i>Aegle marmelos</i>
Mohogany	<i>Swietenia mahagoni</i>
Sweet Orange	<i>Citrus aurantium</i>
Pepper	<i>Piper nigrum</i>
Coffee	<i>Coffea arabica/robusta</i>
Kottamba	<i>Terminalia catappa</i>
Nadun	<i>Pericopsis moomana</i>
Mango	<i>Mangifera indica</i>
Rambutan	<i>Nepheum lappaceum</i>
Jambu	<i>Syzygium jambos</i>
Lunu Midella	<i>Melia azedarach</i>
Jak	<i>Artocarpus hetrophyllus</i>
Del	<i>Artocarpus altilis</i>
Hal	<i>Vateria acuminata</i>
Gauva	<i>Psidium guajava</i>
Munamal	<i>Mimusops elengi</i>
Delum	<i>Punica granatum</i>
Suduhandun	<i>Santalum album</i>

#### 6 Summary of Activities

A co-ordinating office was established in the Wet Zone at Pelmadulla in Ratnapura District, which is very useful for better co-ordination amongst the farmers, Community organisations and other institutions in the area. An official relationship has been developed with the Departments of Forestry and Environment as well as the Department of Export Agriculture, Divisional Secretaries in the District, Samurdi and Grama Niladaris. The Forest Department has agreed to give 2500 plants to these farmers during the next season. One nursery was established at the office site with about 3500 seedlings, which consist of foliage, medicinal plants, vegetables and trees. This nursery will operate as a Sales and a training Centre. A news letter called "Sadisi" is being published with information at the field level which is distributed among farmers.

##### Haldola

A basic orientation programme was done with informal meetings and discussions, which helped to identify the interested groups, their behaviour and attitude towards the project. 25 farmer families were selected from the village. Socio economic data was collected in January, which included administrative boundaries, land tenure, numbers in farmer families, levels of education reached, employment, income and expenditure, health infrastructure, water resource and land management, patterns and extraction of resources from forests. This data was collected from the 25 selected farmer families and detailed farmer profiles were created.

One of the community activities was the construction of the Culvert at Haldola. This helped to reduce the distance from the main road by 5 - 6 miles. It was completed with the assistance of the NFPO and the village community. This was constructed as a Self Help voluntary programme.

A two-day workshop on Analog Forestry was held in Haldola. This was mainly aimed to increase the understanding of Analog Forestry and project activities among the user communities.

A survey of trees was done to determine the

- Number and types of plants in each home garden
- Plants required for home gardening.

The mapping of home gardens was completed, which will be very useful for development and management of home gardens

The Project staff have begun 15 small nurseries in village home gardens Poly bags and the knowledge for the development and management of these nurseries was also distributed.

Vegetable seeds were distributed to 10 selected families An increased income of Rs 250 00 per month has been earned cultivating these vegetables organically

Ginger and turmeric plots were set up in 6 home gardens as a short term income generating activity

Rare seeds and a seedling collecting programme was started with farmers who are interested in earning an extra income

Farmers interested in bee keeping were selected by the project staff For the 1<sup>st</sup> stage, 3 boxes were given to the selected farmers with an established colony of bees This method is useful in attracting more farmers to this project

Special training programmes were conducted in bee keeping, nursery management and compost making.

Project staff established an herbarium in a 5 Acre land at Haldola Temple with the assistance of the villagers and the Department of Ayurveda

### **Bopatta**

A basic orientation programme was conducted with the 25 selected farmer families from the interested groups Data was collected in February from 25 families and detail project profiles were prepared.

Road clearance was identified as a community activity to increase community participation.

2 one day workshops on Analog forestry were held, which increased the knowledge about Analog Forestry and informed the village community about the project

A survey of trees was conducted to identify the numbers and types of plants in each home garden and as to what plants were required by farmers

Data on fauna & flora resources within the forest patches was collected during the past months with the knowledge of the villagers and project staff 15 species of flora, 4 species of birds, 2 species of reptiles and 2 species of insects were identified.

Mapping of home gardens was completed in April

10 small nurseries were completed and poly bags were distributed to villagers by the project

8 farmers who cultivated vegetables organically earned an increased income Ginger and native plant seeding collection is continued as an on going activity

3 bee boxes were given to farmers and two colonies of bees were established. Special training programmes were conducted on bee keeping, compost making and nursery management

The proposed activities for Haldola and Bopatta are

- Development of Office nurseries
- Development of Home gardening nurseries
- Seed and Seedling collecting programmes
- Vegetable, ginger and turmeric cultivation programme as a short-term income generating activity
- Creation of a Herbarium at Haldola temple
- Compost making programme
- Introduce soil conservation and rehabilitation programmes Identification of flora and fauna
- Certification of forest garden products
- Establishing marketing facilities for forest garden products
- Improve the financial stability of Community Based Organisations(CBO)

### **7 Matching Activities**

- Office establishment
- Self-help volunteer programmes & CBO strengthening programmes
- Nursery development
- Establishment of Herbarium at Haldola temple
- Visit to Counterpart International, U S A

## 8 Training Programmes/Community Awareness

The following training programmes have been conducted during the past project period

- Orientation to Analog Forestry
- Workshops on Analog Forestry
- Bee keeping
- Compost making
- Vegetable cultivation organically,
- Nursery development
- CBO strengthening programmes
- Basic need identification

## 9 Plants that are to be incorporated in to the landscape design

Common Name	Botanical Name	Common Name	Botanical Name
Coffee	<i>Coffea robusta</i>	Nutmeg	<i>Myristica fragrans</i>
Lemon	<i>Citrus limon</i>	Halmilla	<i>Berrya cordifolia</i>
Cardomon	<i>Elettaria cardomomum</i>	Katu ikiri	<i>Hygrophila spinosa</i>
Cloves	<i>Syzygium aromaticum</i>	Sweet orange	<i>Citrus sinensis</i>
Ranawara	<i>Cassia auriculata</i>	Mangosteen	<i>Garcinia mangostana</i>
Del	<i>Artocarpus altilis</i>	Pepper	<i>Piper nigrum</i>
Delum	<i>Punica granatum</i>	Kohomba	<i>Azadirachta indica</i>
Suduhandun	<i>Santalum album</i>	Hal	<i>Vateria acuminata</i>
Arecanut	<i>Areca catchu</i>	Koboleela	<i>Bauhinia tomentosa</i>
Nadun	<i>Percopsis mooniana</i>	Mahogany	<i>Swietenia mahogoni</i>
Jam	<i>Muntingia calabura</i>	Ice Cream Bean	<i>Inga edulis</i>
Gaduguda	<i>Baccaurea motleyana</i>	Munamal	<i>Mimusops elengi</i>
Kumbuk	<i>Terminalia arjuna</i>	Beli	<i>Aegle marmelos</i>
King coconut	<i>Cocos nucifera</i>	Banana	<i>Musa acuminata</i>
Avacado	<i>Persea americana</i>	Pini Jambu	<i>Syzygium malaccansis</i>
Bilm	<i>Averrhoa bilimbi</i>	Sawukku	<i>Grevillea robusta</i>
Mango	<i>Mangifera indica</i>	Iramusu	<i>Hemidesmus indicus</i>
Ambrella	<i>Spondias dulcis</i>	Burutha	<i>Chloroxylon swietenia</i>
Red jambu	<i>Syzygium jambos</i>	Cocoa	<i>Theobroma cacao</i>
Uguressa	<i>Flacourtia ramontchi</i>	Kaluwara	<i>Diospyros ebenum</i>
Rambutan	<i>Nephelium lappaceum</i>	Pihumbiya	<i>Filicium decipiens</i>
Karapincha	<i>Murraya koenigii</i>	Durian	<i>Durio zibethinus</i>
Cashew	<i>Anacardium occidentale</i>	Goraka	<i>Garcinia cambogia</i>
Katu Anoda	<i>Annona muricata</i>	Gauva	<i>Psidium guajava</i>
Mee	<i>Madhuca longi folia</i>	Katurumurunga	<i>Sesbania grandiflora</i>
Weli anoda	<i>Annona reticulata</i>	Lunumidella	<i>Melha azedarach</i>

## 10. FLORAL CHECKLIST OF THE PROJECT AREA

### PLANTS AT HALDOLA & BOPATTA

Common Name	Botanical Name	Common Name	Botanical Name
<b>RUBIACEAE</b>		<b>PASSIFLORACEAE</b>	
Coffe	<i>Coffea arabica</i>	Passion Fruit	<i>Passiflora edulis</i>
<b>MYRISTICACEAE</b>		<b>SCITAMINEAE</b>	
Nut meg	<i>Myristica fragrans</i>	Cardomom	<i>Elettaria cardamomum</i>
<b>PIPERACEAE</b>		<b>BOMBACACEAE</b>	
Pepper	<i>Piper nigrum</i>	Durian	<i>Durio zibenthinus</i>
<b>PALMAE</b>		<b>PUNICACEAE</b>	
Arecanut	<i>Areca catechu</i>	Delum	<i>Punica granatum</i>
<b>GRAMINEAE</b>		<b>TILIACEAE</b>	
Banana	<i>Musa acuminata</i>	Jam	<i>Muntingia calabura</i>
		Halmilla	<i>Berrya cordifolia</i>
<b>ANACARDIACEAE</b>		<b>PROTEACEAE</b>	
Mango	<i>Mangifera indica</i>	Sawukku	<i>Grevillea robusta</i>
Cashew	<i>Anacardium occidentale</i>		
Ambrella	<i>Spondias dulcis</i>	<b>EBANACEAE</b>	
<b>EUPHORBIACEAE</b>		Kaluwara	<i>Diospyros ebenum</i>
Rambutan	<i>Nephelium lappaceum</i>		
<b>ANONACEAE</b>		<b>LEGUMINOSAE</b>	
Katu Anoda	<i>Annona Muricata</i>	Nadun	<i>Pericopsis mooniana</i>
Weli Anoda	<i>Annona reticata</i>	Katurumurunga	<i>Sebania grandiflora</i>
		Ranawara	<i>Cassia auriculata</i>
		Koboleela	<i>Bauhinia tomentosa</i>
<b>RUTACEAE</b>		<b>GUTTIFERAE</b>	
Sweet Orange	<i>Citrus aurantium</i>	Mangosteen	<i>Garcinia mangostana</i>
Karapincha	<i>Murraya koenigii</i>		
Burutha	<i>Chloroxylon swietenia</i>	<b>STERCULIACEAE</b>	
Lemon	<i>Citrus limon</i>	Cocoa	<i>Theobroma cacao</i>
<b>LAURACEAE</b>		<b>MELIACEAE</b>	
Avacado	<i>Persea americana</i>	Lunumidella	<i>Melia azedarach</i>
<b>SAPINDACEAE</b>		Mahogany	<i>Swietenia mahagoni</i>
Pihumbiya	<i>Filicium decipiens</i>		
<b>MYRTACEAE</b>		<b>SAPOTACEAE</b>	
Gauva	<i>Psidium guajava</i>	Munamal	<i>Mimusops elengi</i>
Cloves	<i>Syzygium aromaticum</i>	Mee	<i>Madhuca longifolia</i>
Pini Jambu	<i>Syzygium malaccensis</i>		
Red Jambu	<i>Syzygium jambos</i>	<b>OXALIDACEAE</b>	
<b>FLACOURTIACEAE</b>		Bilin	<i>Averrhoa bilimbi</i>
Uguressa	<i>Flacourtia ramontchi</i>		
<b>MORACEAE</b>		<b>COMBRETACEAE</b>	
Del	<i>Artocarpus altilis</i>	Kumbuk	<i>Terminalia arjuna</i>
<b>SANTALACEAE</b>			
Suduhandun	<i>Santalum album</i>		

**Only at Bopatta**

**COMBRETACEAE**

Kotamba *Terminalia catappa*

**ELAEOCARPACEAE**

Weralu *Elaeocarpus serratus*

**MELIACEAE**

Kohomba *Azadirachta indica*

**ACANTHACEAE**

Katu ikri *Hygrophila spinosa*

**MORACEAE**

Jak *Artocarpus heterophyllus*

**DIPTEROCARPACEAE**

Hal *Vateria acuminata*

**ASCLEPIADACEAE**

Iramusu *Hemidesmus indicus*

**Only at Haldola**

**RUBIACEAE**

Coffee *Coffea robusta*

**RUTACEAE**

Beli *Aegle marmelos*

**GUTTIFERAE**

Goraka *Garcinia cambogia*

**11 FAUNAL CHECKLIST OF PROJECT AREA**

**Birds**

**CORVIDAE**

Black Crow *Corvus splendens*

**STURNIDAE**

Common Grackle *Gracula religiosa*  
Common Mynah *Acridotheres tristis*

**PYCNONOTIDAE**

Black bulbul *Hypsipetes leucocephalus*

**ACCIPITRIDAE**

Ceylon Crested Hawk Eagle *Spizaetus cirrhatus*  
Black-winged Kite *Elanus caeruleus*

**PHASIANIDAE**

Jungle Bush Quail *Perdica asiatica*  
SriLanka Jungle Fowl *Gallus lafayetii*

**ORIOOLIDAE**

Black Headed Oriole *Oriolus xanthornus*

**NECTARINIDAE**

Small Flower Pecker *Dicaeum - erythrorhynchos*

**MEGALAIMIDAE**

Brown Headed Barbet *Megalaima zeylanica*

**BATAHOSTOMIDAE**

Frog Mouth *Batrachostomus - momheger*

**SYLVIDAE**

Common Tailor Bird *Orthotomus sutorius*  
Brown Capped Babbler *Pellorueum fuscicapillum*  
Ceylon Scimitar Babbler *Pomatorhinus horsfieldii*

**DASSERIDAE**

Spotted Munia *Lonchura punctulata*

**BUCEROTIDAE**

SriLanka Grey Hornbill *Ocyeros gingalensis*

**Amphibians**

**BUFONIDAE**

*Bufo kelartii*

## Reptiles

### TETRAPODS

#### AGAMIDAE

*Calotes calotes*  
*Calotes versicolor*  
*Otocryptis wiegmanni*

#### GEKKONIDAE

*Hemidactylus brooki*  
*Hemidactylus depressus*

#### SCINCIDAE

*Mabuya carinata*

#### VARNIDAE

*Varanus cepedianus*

### SNAKES

#### COLUBRIDAE

*Elaphe helena*  
*Ptyas mucosus*  
*Dendrelaphis tristis*  
*Ahaetulla nasutus*  
*Amphiesma stolata*  
*Oligodon taeniolatus*  
*Xenochrophis piscator*

#### VIPERIDAE

*Daboia russelli*  
*Hypanale hypanale*  
*Trimeresurus trigonocephalus*

#### UROPELTIDAE

*Cylindrophis maculatus*

#### ELAPIDAE

*Naja naja*

#### BOIDAE

*Python molurus*

## Butterflies

### Common Name

### Zoological Name

#### DANAIDAE

Ceylon Tree Nymph  
 Glassy Tiger  
 Common Tiger  
 Plain Tiger  
 Common Indian Crow

*Idea isaonia*  
*Parantica aglea*  
*Danaus genutia*  
*Danaus chrysippus*  
*Euploea core*

#### NYMPHALIDAE

Clipper \*  
 Common Sailor  
 Peacock Pansy  
 Common Castor

*Parthenos sylvia*  
*Nepis hylas*  
*Junonia almana*  
*Ariadne merione*

### Common Name

### Zoological Name

#### PAPILIONIDAE

Crimson Rose  
 Blue Mormon  
 Common Mormon  
 Tailed Jay  
 Common Birdwing

*Pachliopta hector*  
*Papilio polymnestor*  
*Papilio polytes*  
*Graphium agamemno*  
*Troides darsius*

#### PIERIDAE

Psyche  
 Lesser Albatross  
 Common Albatross  
 Lemon Migrant  
 Small Grass Yellow  
 Common Grass Yellow  
 Three Spot Grass  
 Yellow

*Leptostia mina*  
*Appias paulina*  
*Appias albina*  
*Catopsilia pomona*  
*Eurema brigitta*  
*Eurema hecabe*  
*Eurema blanda*

## Mammals

#### CERCOPITHECIDAE

Torque Monkey

*Macaca sinica*

#### SCIURIDAE

Giant Squirrel  
 Palm Squirrel

*Ratufa macroura*  
*Funambulus palmarum*

#### LEPORIDAE

Black Naped Hare

*Lepus nigricollis*

**Co-ordinator: Mr. Prabath Kumara**  
**Future in Our Hands Organisation (FIOH)**  
**Location: Dry & Intermediate Zone - Badalkumbura and Moneragala**

**1 Total Number of Farmers and Farmer Families**

	Female	Male	Total	Land (Acres)	Monthly Income(Rs )
<b>Badalkumbura Division -</b>					
Hindikwula Village	16	2	18	33 25	33,250 00
Pussalawa Village	21	5	26	58	42,400 00
Yakurawa Village	10	3	13	34	26,300 00
Madugasmulla Village	28	4	32	30 5	32,950 00
Katugahagalge Village	31	-	31	36	35,700 00
Madamagama Village	31	7	38	39 75	35,000 00
Punsisigama Village	29	-	29	45 75	39,300 00
	<b>166</b>	<b>21</b>	<b>187</b>	<b>307 25</b>	<b>244,900 00</b>
<b>Moneragala Division -</b>					
Hindikwula Village	22	7	29	33 25	22,800 00
Vadikumbura Village	35	5	40	26	25,600 00
Vallyyaya Village	37	4	41	66	46,570 00
	<b>94</b>	<b>16</b>	<b>110</b>	<b>125 25</b>	<b>94,970 00</b>
<b>Total</b>	<b>260</b>	<b>37</b>	<b>297</b>	<b>432 5 Acres</b>	<b>Rs. 339,870 00</b>

**2 Existent and Potential Forest Garden Crops**

Common Name	Botanical Name	Use	Common Name	Botanical Name	Use
Jak	<i>Artocarpus heterophyllus</i>	Fruit	Coconut	<i>Cocos nucifera</i>	Nut
Breadfruit	<i>Artocarpus altilis</i>	Fruit	Arecanut	<i>Areca catechu</i>	Nut
Lime	<i>Citrus aurantifolia</i>	Fruit	Cashew	<i>Anacardium occidentale</i>	Nut
Narang	<i>Citrus nobilis</i>	Fruit	Coffee	<i>Coffea robusta</i>	Bev
Mandarin	<i>Citrus reticulata</i>	Fruit	Cocoa	<i>Theobroma cacao</i>	Bev
Orange	<i>Citrus aurantium</i>	Fruit	Kitul	<i>Caryota urens</i>	Sugar
Katu Anoda	<i>Annona muricata</i>	Fruit	Gammalu	<i>Pterocarpus marsupium</i>	Resin
Anoda	<i>Annona reticulata</i>	Fruit	Manioc	<i>Manihot esculenta</i>	Yam
Wood apple	<i>Feroma elephantia</i>	Fruit	Kiri ala	<i>Colocasia esculenta</i>	Yam
Mango	<i>Mangifera indica</i>	Fruit	Seeni-ala	<i>Dioscorea sp</i>	Yam
Pine apple	<i>Ananas comosus</i>	Fruit	Sweet Potato	<i>Ipomoea batatas</i>	Yam
Banana	<i>Musa acuminata</i>	Fruit	Murunga	<i>Moringa oliefera</i>	Veg
Papaw	<i>Carica papaya</i>	Fruit	Katurumurunga	<i>Sesbania grandiflora</i>	Veg
Pomegranate	<i>Punica granatum</i>	Fruit	Pepper	<i>Piper nigrum</i>	Spice
Avacado	<i>Persea americana</i>	Fruit	Karapuncha	<i>Murraya koenigii</i>	Spice
Mora	<i>Glenniea unjuga</i>	Fruit	Ginger	<i>Zingiber officianale</i>	Spice
Jambu	<i>Syzygium jambos</i>	Fruit	Turmeric	<i>Curcuma domestica</i>	Spice
Rambutan	<i>Nephelium lappaceum</i>	Fruit	Rampeh	<i>Pandanus amaryllifolius</i>	Spice
Gauva	<i>Psidium guajava</i>	Fruit	Cinnamon	<i>Cinnamomum zeylanicum</i>	Spice
Uguressa	<i>Flacourtia ramontchi</i>	Fruit	Cloves	<i>Syzygium aromaticum</i>	Spice

### Forest Garden Crops (continued)

Passion fruit	<i>Passiflora edulis</i>	Fruit	Mustard	<i>Brassica juncea</i>	Herb
Lovi	<i>Flacourtia inermis</i>	Fruit	Betel	<i>Piper betle</i>	Med
Veralu	<i>Elaeocarpus serratus</i>	Fruit	Kohomba	<i>Azadirachta indica</i>	Med
Tamarind	<i>Tamarindus indica</i>	Fruit	Nelli	<i>Phyllanthus embelica</i>	Med
Ambrella	<i>Spondias dulcis</i>	Fruit	Rasakanda	<i>Tinospora cordifolia</i>	Med
Polpala	<i>Aerva lanata</i>	Med	Ehala	<i>Cassia fistula</i>	Med
Iramusu	<i>Hemidesmus indicus</i>	Med	Ranawara	<i>Cassia auriculata</i>	Med
Tipili	<i>Piper longum</i>	Med	Yakinaarang	<i>Atalantia ceylanica</i>	Med
Rathmal	<i>Ixora coccinea</i>	Med	Aralu	<i>Terminalia chebula</i>	Med
Hee Rassa	<i>Cissus quadrangularis</i>	Med	Bulu	<i>Terminalia belerica</i>	Med
Butsarana	<i>Canna indica</i>	Cultural			

### 3 Plants at Nursery in MONERAGALA

Common Name	Botanical Name	Common Name	Botanical Name
Pepper	<i>Piper nigrum</i>	Nelli	<i>Phyllanthus embelica</i>
Katurumurunga	<i>Sesbania grandiflora</i>	Mango	<i>Mangifera indica</i>
Papaw	<i>Carica papaya</i>	Coffee	<i>Coffea robusta</i>
Betel	<i>Piper betle</i>	Kohomba	<i>Azadirachta indica</i>
Polpala	<i>Aerva lanata</i>	Iramusu	<i>Hemidesmus indicus</i>
Ranawara	<i>Cassia auriculata</i>	Banana	<i>Musa acuminata</i>
Thippili	<i>Piper longum</i>		

### Plants at Nursery in BADALKUMBURA

Pepper	<i>Piper nigrum</i>	Betel	<i>Piper betle</i>
Kohomba	<i>Azadirachta indica</i>	Coffee	<i>Coffea robusta</i>
Mango	<i>Mangifera indica</i>	Papaw	<i>Carica papaya</i>
Nelli	<i>Phyllanthus embelica</i>	Katurumurunga	<i>Sesbania grandiflora</i>
Ginger	<i>Zingiber officinale</i>	Naran	<i>Citrus nobilis</i>
Gurulla	<i>Leea indica</i>	Rathmal	<i>Ixora coccinea</i>
Mustard	<i>Brassica juncea</i>	Turmeric	<i>Curcuma domestica</i>
Hee ressa	<i>Cissus quadrangularis</i>	Rampeh	<i>Pandanus amaryllifolius</i>

### 4 Summary of Activities

#### January 1998

Trained staff identified farmers and began to draw the farm plans. Dr Ranil Senanayake visited the Moneragala office and addressed the staff, clarified issues and examined land plans whilst proffering suggestions for improvements. The area manager of the Southern Development Authority inquired about the growing of Gotukola (*Centella asiatica*), since there is a ready market for it. Mr Lawrence Goldberg, Manager, NSRC Certification Office explained the need for certification and how to go about it. Dr Senanayake visited the land of one farmer in Moneragala with the staff and the representative of Southern Development Authority.

The NSRC/Counterpart monthly meeting was held on 13<sup>th</sup> January. 15 animators were summoned to one of the selected farmer's lands for a practical session. 30 metre soil erosion traps were prepared and the essentials of soil conservation were discussed.

A one day workshop was held for all staff members at Moneragala. The progress and status of on-going programmes were discussed. A questionnaire to record the present status of the farmer's gardens was also a subject for discussion.

### **February 1998**

A staff training meeting was conducted on the 10<sup>th</sup> of February 7 animators and 8 village assistants took part. We attended the monthly monitoring & evaluation meeting in Colombo

Another staff & farmer training program was held on 21<sup>st</sup> and 22<sup>nd</sup>, where the importance of field experience and the importance of bio-diversity conservation, the interrelation of plants & animals were discussed. In addition a slide show on birds & environmental conservation was presented. The group were introduced to the data required by Counterpart International

A National workshop was held on 28<sup>th</sup> in Colombo on the Impact of Intellectual Property rights (IPR) regimes on Ayurvedic & Indigenous knowledge systems of Sri Lanka hosted by NSRC and held at the Ceylon Institute of Scientific and Industrial Research 10 members of FIOH attended this meeting

### **March 1998**

We attended the the National Farmer Forum National meeting sponsored by the Consultative Group on International Agricultural Research (CGIAR) hosted by NSRC on the 2<sup>nd</sup> March, with many members staff and farmers The meeting discussed issues like food security, management of natural resources, sensitive environments and building the capacity of farmers for ensuring sustainable livelihoods

A field inspection was conducted in Moneragala on the 4<sup>th</sup> March.

A farmer training programme was held on 7<sup>th</sup> March, where 30 farmers participated. Slide shows and group discussions on analog forestry and biodiversity conservation took place

A field 'exposure' program was held on 8<sup>th</sup> March on 3 different farmer's lands 30 participants in 3 groups studied landscape design, identified the trees on the land, the soil condition, canopy levels and planned the planting of suitable new plants & trees

Another field inspection was conducted and a monthly progress review was held on 12<sup>th</sup> & 14<sup>th</sup> March.

A workshop on water related issues in Moneragala was held on 17<sup>th</sup> March All the staff members as well as small groups of farmers and farmer organizations attended.

The monthly staff meeting was held on the 30<sup>th</sup> to monitor & evaluate the past activities The problems faced by the staff and possible solutions were discussed. Mapping lands and collection of baseline data for 250 families was completed in addition to maps and survey sheets held by all field assistants

### **April 1998**

A practical session was held on 7<sup>th</sup> April which included the drawing of maps describing the landscape design of farmer's gardens 8 animators conducted progress review meetings with 255 farmers after the completion of the mapping of their lands

### **May & June 1998**

Yet another practical session was held between 22<sup>nd</sup> and 31<sup>st</sup> May 8 animators trained farmers in the techniques of plant/seed propagation for 4 Grama Seva Divisions

We selected the specific sites for tree planting

### **5 Matching Activities**

The establishment of an office The supply of teaching aids Nursery Development. Soil conservation Land preparation. Fencing. Crop protection Irrigation Weeding. Establishment of Community Benefit Organisations Training in simple book keeping Participatory training & evaluation

Mr Prabath Kumara visited Norway on behalf of FIOH where he attended fruitful meetings with Rain Forest Foundation International, Amnesty International and the Norad Asia Desk. The main idea was to build links for FIOH as well as NSRC Mr Prabath Kumara has been appointed as a Joint Secretary of the Green Movement in Sri Lanka

### **6 Training Programmes to foster Community Awareness in the following**

- Health & Nutrition
- Environmental Conservation
- Organic farming
- Human rights

## 6 Floral Checklist recorded in project area

### APOCYNACEAE

Ruk aththana	<i>Alstonia scholaris</i>
Kitul	<i>Caryota urens</i>

### VERBENACEAE

Teak	<i>Tectona grandis</i>
Mulla	<i>Vitex pinnata</i>

### MORACEAE

Jak	<i>Artocarpus heterophyllus</i>
Del	<i>Artocarpus altilis</i>
Bo Tree	<i>Ficus religiosa</i>
Nuga	<i>Ficus benghalensis</i>

### MYRTACEAE

Cloves	<i>Syzygium aromaticum</i>
Damba	<i>Syzygium assimile</i>
Gauva	<i>Psidium guajava</i>

### MELIACEAE

Lunumidella	<i>Melia azedarach</i>
Hulan hik	<i>Chukrasia tabularis</i>

### EUPHORBIACEAE

Nelli	<i>Phyllanthus embelica</i>
Murunga	<i>Moringa oleifera</i>
Katakeela	<i>Bridelia retusa</i>
Rubber	<i>Hevea brasiliensis</i>
Manioc	<i>Manihot esculenta</i>
Kenda	<i>Macaranga peltata</i>

### STERCULIACEAE

Cocoa	<i>Theobroma cacao</i>
Thelanbu	<i>Sterculia foetida</i>

### CARICACEAE

Papaw	<i>Carica papaya</i>
-------	----------------------

### LEGUMINOSAE

Katurumurunga	<i>Sesbania grandiflora</i>
Mara	<i>Albizia lebbek</i>
Siyambala	<i>Tamarindus indica</i>
Gal Siyambala	<i>Dialium ovoideum</i>
Suriya mara	<i>Albizia odoratissima</i>
Gammalu	<i>Pterocarpus marsupium</i>

### MALVACEAE

Suriya	<i>Thespesia populnea</i>
--------	---------------------------

### LAURACEAE

Kadudawla	<i>Neolitsea fuscata</i>
Avacado	<i>Persea americana</i>
Cinnamon	<i>Cinnamomum zeylanicum</i>

### PALMAE

Coconut	<i>Cocos nucifera</i>
Tal	<i>Borassus flabellifer</i>
Arecanut	<i>Areca catechu</i>

### GRAMINAE

Banana	<i>Musa aurantium</i>
--------	-----------------------

### RUTACEAE

Orange	<i>Citrus sinensis</i>
Narang	<i>Citrus nobilis</i>
Jambola	<i>Citrus grandis</i>
Wood Apple	<i>Feronia elephantia</i>
Jambu	<i>Syzygium jambos</i>
Burutha	<i>Chloroxylon swietenia</i>

### PUNICACEAE

Delum	<i>Punica granatum</i>
-------	------------------------

### SAPOTACEAE

Palu	<i>Manilkara hexandra</i>
------	---------------------------

### ANACARDIACEAE

Cashew	<i>Anacardium occidentale</i>
Bala	<i>Nathopegia beddomei</i>
Mango	<i>Mangifera indica</i>
Etamba	<i>Mangifera zeylanica</i>

### FLACOURTIACEAE

Uguressa	<i>Flacourtia ramontchi</i>
Lovi	<i>Flacourtia inermis</i>

### EBENACEAE

Kaluwara	<i>Diospyros ebenum</i>
Thimbiri	<i>Diospyros insignis</i>
Kaluwella	<i>Diospyros racemosa</i>
Kalumediya	<i>Diospyros quaesita</i>

### COMBRETACEAE

Bulu	<i>Terminalia belerica</i>
Kottamba	<i>Terminalia catappa</i>
Aralu	<i>Terminalia chebula</i>
Kumbuk	<i>Terminalia arjuna</i>

Floral Checklist (continued)

**ELAEOCARPACEAE**

Anoda *Annona reticulata*  
Weralu *Elaeocarpus serratus*

**TILIACEAE**

Jam *Muntingia calabura*  
Halmilla *Berrya cordifolia*

**BOMBACACEAE**

Kotta *Ceiba pentandra*

**SOLANACEAE**

Brinjal *Solanum melongena*

**MAGNOLIACEAE**

Sapu *Michaelia champaca*

**ULMACEAE**

Gedumba *Trema orientale*

**SAPINDACEAE**

Mora *Glennia unijuga*  
Kon *Schleichera oleosa*

**RUBIACEAE**

Kolon *Adina cordifolia*

11 Faunal Checklist recorded in project area

**REPTILES**

**Snakes**

**COLUBRIDAE**

*Ptyas mucosus*  
*Dendrelaphis tristis*  
*Ahaetulla pulverulentus*  
*Ahatulla nasutus*  
*Amphiesma stolata*  
*Elaphe helena*  
*Lycodon aulicus*  
*Oligodon sublineatus*

**ELAPIDAE**

*Naja naja*  
*Bangarus caeruleus*

**VIPERIDAE**

*Vipera russelli*  
*Hypanale hypanale*

**BOIDAE**

*Python molurus*

**Tetrapods**

**GEKKONIDAE**

*Hemidactylus brooki*

**VARANIDAE**

*Varanus salvator*  
*Varanus cepedianus*

**AGAMIDAE**

*Calotes calotes*  
*Calotes versicolor*

**SCINCIDAE**

*Mabuya carinata*

**TESTUNIDAE**

*Testudo elegans*

## Amphibians

### BUFONIDAE

*Bufo melanostictus*

### RANIDAE

*Euphlyctis cyanophlyctis*

## Birds

### CORVIDAE

Village Crow

*Corvus splendens*

### AEGITHININAE

Ceylon Iora

*Aegithina tiphia*

### IRENIDAE

Jerdon's chloropsis

*Chloropsis cochinchinensis*

### SYLVIDAE

Green Tree Warbler

*Phylloscopus trochiloides*

Large Billed Tree Warbler

*Phylloscopus magnirostris*

Common Tailor Bird

*Orthotomus sutorius*

### SYLVIINAE

Common Babbler

*Turdoides affinis*

### PITTIDAE

Indian Pitta

*Pitta brachyura*

### PYCNONOTIDAE

Red Vented Bulbul

*Pycnonotus cafer*

Yellow Browed Bulbul

*Iole indica*

Black Bulbul

*Hypsipetes leucocephalus*

### MUSCICAPIDAE

Black Robin

*Saxicoloides fulicata*

Magpie Robin

*Copsychus saularis*

Orange Breasted Blue Fly Catcher

*Cyornis tickelliae*

Grey headed Fly Catcher

*Culicicapa ceylonensis*

### CISTICOLIDAE

Ashy Prinia

*Prinia socialis*

### ORIOOLIDAE

Orange Minivet

*Perierocotus flammeus*

Black Headed Oriole

*Oriolus xanthornus*

### STURNIDAE

Common Grackle

*Gracula religiosa*

Common Mynah

*Acridotheres tristis*

### DICRURIDAE

Black Drongo

*Dicrurus macrocercus*

### ESTRILDINAE

Spotted Munia

*Lonchura punctulata*

### PASSARIDAE

House Sparrow

*Passer domesticus*

### NECTARINIDAE

Loten's Sunbird

*Nectarinia lotema*

Purple Sunbird

*Nectarinia asiatica*

Small Flower Pecker

*Dicaeum erythrorhynchos*

### MEGALAIMIDAE

Brown Headed Barbet

*Megalama zeylanica*

Yellow Fronted Barbet

*Megalama flavifrons*

Sri Lanka Small Barbet

*Megalama rubricapilla*

## Birds (continued)

### PSITTACIDAE

Layard's Parakeet

*Psittacula calthropae*

### COLUMBRIDAE

Pompadour Green Pigeon

*Treron pompadora*

### ARDEIDAE

Pond Heron

*Ardeola grayii*

### ALCEDINIDAE

Common Kingfisher

*Alcedo atthis*

### DACELONIDAE

White Breasted Kingfisher

*Halcyon smyrnensis*

## Butterflies

### DANAIIDAE

Common Indian Crow

*Euloea core*

Glassy Tiger

*Parantica aglea*

Common Tiger

*Danaus genutia*

Plain Tiger

*Danaus chrysippus*

### NYMPHALIDAE

Clipper \*

*Parthenos sylvia*

Common Sailor

*Neptis hylas*

Peacock Pansy

*Junonia almana*

Common Castor

*Ariadne merione*

### PAPILIONIDAE

Crimson Rose

*Pachioptera hector*

Blue Mormon

*Papilio polymnestor*

Common Mormon

*Papilio polytes*

Tailed Jay

*Graphium agamemnon*

### PIERIDAE

Psyche

*Leptosia nina*

Lesser Albatross

*Appias paulina*

Common Albatross

*Appias albina*

Small Grass Yellow

*Eurema brigitta*

Common Grass Yellow

*Eurema hecabe*

## Mammals

### CERCOPITHECIDAE

Torque Monkey

*Macaca sinica*

### SCIURIDAE

Giant Squirrel

*Rutufa macroura*

Palm Squirrel

*Funambulus palmarum*

### LEPORIDAE

Black Naped Hare

*Lepus nigricollis*

### BOVIDAE

Buffaloe

*Bubalus bubalus*

### CERVIDAE

Spotted Deer

*Cervus axis*

### SUIDAE

Wild Boar

*Sus scrofa*

### HYSTRICIDAE

Porcupine

*Hystrix indica*

### CANIDAE

Jackal

*Canis aureus*

## Co-ordinator – Thilak Obeysekera

Location: Wetlands of Panadura - Kaduruđuwa Island & Bolgoda

### 1 TOTAL NUMBER OF PARTICIPANTS (FAMILIES)

1	Sisira Kalani	8	Chaminda Sandaruwan
2	Nirosha Gayani	9	Dinusha S Liyanarachchi
3	Dharshana Chathurangani	10	Kasun J Samarawickrama
4	Rashini de Silva	11	Jayani Mahashika
5	S A Dulanjani	12	Peshala W Premaratne
6	Lasith S Munasinghe	13	Anusha Perera
7	R.M Charaka Ranasinghe	14	Chamith I Wannage

Number of Female Members	-	9
Number of Male Members	-	5
<b>Total number of Members</b>	-	<b>14</b>

### 2 TOTAL LAND COVERED

Kaduruđuwa	-	25 Acres
Bolgoda Area	-	150 Acres ( Including Research Centre area)
<b>Total Land covered</b>	-	<b>175 Acres</b>

### 3 POTENTIAL FOREST GARDEN CROPS

Common Name	Botanical Name	Uses
Kirala	<i>Sonneratia caseolaris</i>	Roots for cork
Gm Pol	<i>Nipa fruticans</i>	Sugar
Dan	<i>Syzygium caryophyllatum</i>	Fruit
Manel	<i>Nymphaea stellata</i>	Cut flower
Sudu Olu	<i>Nymphaea lotus</i>	"
Bera Olu	<i>Nymphaea sp</i>	"
Nelum	<i>Nelumbium speciosum</i>	"
Sudu Nelum	<i>Nelumbium sp</i>	"
Kekatiya	<i>Aponogeton crispus</i>	Food

### 4 SUMMARY OF ACTIVITIES

#### January and February, 1998

Talked to the representatives of the local community to discuss their role in the project. The response was very positive.

Constructed a small cottage at Bolgoda for lodging purposes, which saved us time and money in travelling to our island office. Made field trips to record birds, reptiles and other animals in both sites. Prepared a field data form to record the immigration of fishes in the lake. Volunteers were given lectures on recording animal species for research purposes at Bolgoda and field visits were made to Kaduruđuwa for bird watching during weekends.

The old boy's association of St. Johns College, Panadura has given their fullest support and also space for a school branch office. An exhibition was held for students of Royal College, Colombo on 12<sup>th</sup> & 14<sup>th</sup> February.

Three lectures were given to the student's study group at St. Johns College, Panadura.

Students of Sri Sumangala College, Panadura were accompanied for a field trip to Bata Domba Lena.

The map of the 2 study areas were drawn as well as the map of the course taken by the Bolgoda river.

## **February and March 1998**

Project activities have been focused in the following areas

Education

Community activities

Research

### **Kaduruduwa island is situated in the middle of the Panadura wetlands**

Initiated the collection of sociological data and the mapping of home gardens. Cleaned the island of non bio-degradable items and negotiated with a commercial firm to re-cycle the polythene.

Most of the villagers re-claim land by piling soil till the edge of the river. This soil washes away easily after a heavy rain and we have initiated the planting of trees to hold back the soil and create quick shade. We plan to plant the river boundaries with native mangrove trees and the other areas with ecologically useful plants.

### **Bolgoda is situated alongside the river on its upward course**

Completed the construction of the research cottage. The reptile collection is kept at Bolgoda for educational exhibitions, at which some reptiles are kept till they are released. Construction of a reptilium is in progress. 3 lectures were conducted for school children and 5 more are being organized.

5 day training programme for trainee doctors of Native Ayurvedic Medical school, Maalewana in reptile studies. This is to enable these doctors to identify snakes, in their treatment of snake-bites.

Participated in a 4 day workshop at Royal College, Homagama organised by Agrarian Products Corporation, where we addressed the subject of 'Environmental conservation'.

Sri Sumangala college, Panadura was added to our membership and now houses the 'Field Study Centre'.

A visit to the mangroves was arranged for students of the Field Study Centre.

A survey to determine the patterns of fish migrations is in progress, as well as research on damselflies, dragonflies and butterflies.

## **April & May 1998**

### **Kaduruduwa**

Male and female volunteer members were given training on biodiversity relative to the wetland areas, especially in Kaduruduwa. Designed a form to gather information about the residents of the area. Planned to grow the plants required for habitat enrichment in the island nurseries.

Initiated the plant nursery at the Field Study Centre.

### **Bolgoda**

Initiated another training centre at this site office as well as a plant nursery.

Conducted a lecture at Panadura field centre on 20<sup>th</sup> May.

Conducted a lecture at Beruwela Maalewana Aurvedic College on 27<sup>th</sup> May.

Participated in an environmental exhibition held at Nikapotha for the public and school children on 29<sup>th</sup>, 30<sup>th</sup> & 31<sup>st</sup> May.

2 day workshop on 'Mangrove habitats' was organised for voluntary members.

Initial survey was done regarding the population of the Kaduruduwa and adjacent areas where 4 project team members and 5 voluntary school members participated.

A field education trip was organised to the Bata Dombe Lena forest. Released several reptile species to their natural habitats.

Gained useful information on Mangroves from Mr Peter Bennet, an Englishman who is an expert on the subject, when he visited the island on 20<sup>th</sup> May.

Recorded a very rare reptile from the 'Celerus species'. The mother snake was wounded when discovered, and the only surviving baby snake from the batch of 8, was later released.

We were requested by the Provincial Council to commence conservation work on some uninhabited islands under our project area near the village called Diggala.

## **June 1998**

### **Kaduruduwa**

We discussed our plans for environmental conservation of the area with the Nayaka Priest of the village temple, where we got permission to start a small nursery and an office in the temple premises.

With the assistance of the officials of the Youth Activities Society of the area we persuaded most of the residents to participate in our project activities. 14 members signed on initially.

These members agreed to plant seeds distributed by us in their own gardens and also to help us to enlist more people to our projects.

## Bolgoda

Preparations for the nursery were completed with an initial quantity of 400 plants. The project activities had to be slowed down due to the heavy rains which caused minor floods with the water rising to about 1 ¼ ft. The temporary resting place built for fish species faced the danger of being washed off and was speedily removed to other areas, some fish were released to their natural habitats.

Community and Reptile study courses were conducted by the Panadura Field study centre on 10<sup>th</sup>, 17<sup>th</sup> and 24<sup>th</sup> for 60 – 70 participants.

New female cadets joined our team. We are trying to establish Environment Cadet teams in 4 schools in the district and offer field education trips for the teams.

Discussions were held with a selected group from the Kaduruwa island on 21<sup>st</sup> June, regarding the island's environment status.

A public lecture was conducted on Environmental conservation and possible community activities in this regard on the 5<sup>th</sup> of June.

An exhibition was organized for the general public and school children at the Public Library, Colombo on 3<sup>rd</sup> June.

A one day workshop was conducted by Mr Ajith Lokuge on 8<sup>th</sup> June for the team of researchers.

Conducted a field visit to Kaduruwa with school children on 21<sup>st</sup> June.

Conducted a field trip to Bata Dombe Lena forest area with 4 project members on 24<sup>th</sup> June, in order to locate nursery seedlings and to release reptiles.

With the arrival of the rainy season, we are seeking the assistance of the Colombo National Museum for the breeding of Caterpillars.

## 5 MATCHING ACTIVITIES

- Development of Reptileum,
- Released approximately 125 baby snakes after hatching to their natural habitats
- Released the reptiles in capture to their natural habitats
- Construction of the Training Centre at Bolgoda
- Research work on Dragonflies, Damselflies, Butterflies and Fish migratory patterns
- Participated in 20 Exhibitions
- Planted mangrove tree species on the Kaduruwa island with the assistance of village children.
- Preparation of Photo Albums for the two project sites
- Participated in a Reef Cleaning Program

## 6. Floral checklist recorded in Project area.

### Mangrove Plants

#### Common Name

#### Botanical Name

#### RHIZOPHORACEAE

Kadol

*Rhizophora mucronata*

Kadol

*Rhizophora apiculata*

Path Kadol

*Bruguiera gymnorhiza*

#### SONNERATIACEAE

Kirala

*Sonneratia caseolaris*

#### EUPHORBIACEAE

Thela Keeriyā

*Excoecaria agallocha*

#### ACANTHACEAE

Katu Ikili

*Acanthus ilicifolius*

#### AVICENNIACEAE

Kanna

*Avicennia marina*

Beriyā

*Lumnitzera racemosa*

### Mangrove Plant Associates

#### Common Name

#### Botanical Name

#### POLYPODIACEAE

Kaerakoku

*Acrostichum aureum*

#### BIGNONIACEAE

Diya Danga

*Dolichandrone spathacea*

#### MALVACEAE

Belli patta

*Hibiscus tiliaceus*

#### APOCYNACEAE

Gon Kaduru

*Cerbera odallam*

#### STERCULIACEAE

Etuna

*Heritiera littoralis*

#### COMBRETACEAE

Kottan

*Terminalia catappa*

**Other species noted****MORACEAE**

Jak	<i>Artocarpus heterophyllus</i>
Del	<i>Artocarpus altilis</i>
Wal Del	<i>Artocarpus nobilis</i>
Dan	<i>Syzygium caryophyllum</i>

**PALMAE**

Coconut	<i>Cocos nucifera</i>
King Coconut	<i>Cocos nucifera</i>
Arecanut	<i>Areca catechu</i>
Kithul	<i>Caryota urens</i>

**GRAMINEAE**

Bamboo	<i>Bambusa vulgare</i>
Banana	<i>Musa acuminata</i>

**RUTACEAE**

Lime	<i>Citrus aurantifolia</i>
Orange	<i>Citrus aurantium</i>
Narang	<i>Citrus nobilis</i>
Bel	<i>Aegle marmelos</i>

**EUPHORBIACEAE**

Nelli	<i>Phyllanthus embelica</i>
Tamarind	<i>Tamarindus indica</i>

**SAPINDACEAE**

Munamal	<i>Mimusops elengi</i>
Rambutan	<i>Nephelium lappaceum</i>
Pihumbia	<i>Felicium decipiens</i>

**DILLENIACEAE**

Diya para	<i>Wormia triquetra</i>
Godapara	<i>Dillenia retusa</i>

**ELAEOCARPACEAE**

Weralu	<i>Elaeocarpus glandulifer</i>
Domba	<i>Calophyllum inophyllum</i>

**APOCYNACEAE**

Araliya	<i>Nerium oleander</i>
Alstonia	<i>Alstonia scholaris</i>

**LILLIACEAE**

Hathawanya	<i>Asparagus racemosus</i>
------------	----------------------------

**DIPTEROCARPACEAE**

Hal	<i>Vateria capallifera</i>
Diya Belanya	<i>Doona cordifolia</i>

**PONTEDERIACEAE**

Japan Jabara	<i>Eichhornia crassipes</i>
--------------	-----------------------------

**CONVOLVULACEAE**

Kumudu	<i>Paederia foetida</i>
--------	-------------------------

**MYRTACEAE**

Gauva	<i>Psidium guajava</i>
Pini Jambu	<i>Syzygium malaccensis</i>
Jambu	<i>Syzygium jambos</i>

**ANACARDIACEAE**

Mango	<i>Mangifera indica</i>
Cashew	<i>Anacardium occidentale</i>
Amberella	<i>Spondias dulcis</i>

**MELIACEAE**

Mahogany	<i>Swietenia mahagoni</i>
Kohomba	<i>Azadirachta indica</i>
Lunumidella	<i>Melia azedarach</i>

**LEGUMINOSAE**

Kathurumurunga	<i>Sesbania grandiflora</i>
Kattakumanjal	<i>Myroxylon balsumum</i>
Karanda	<i>Pongamia pinnata</i>

**GUTTIFERAE**

Goraka	<i>Garcinia cambogia</i>
Mangosteen	<i>Garcinia mangostana</i>
Divi Kaduru	<i>Rejoua dichotoma</i>

**SAPOTACEAE**

Lawalu	<i>Chrysophyllum roxburghii</i>
Sapodilla	<i>Achras sapota</i>

**OXALIDACEAE**

Bilin	<i>Averrhoa bilimbi</i>
-------	-------------------------

**COMBRETACEAE**

Kottamba	<i>Terminalia catappa</i>
----------	---------------------------

**VERBENACEAE**

Ganda pana	<i>Lantana camara</i>
Pinna	<i>Clerodendrum infortunatum</i>
Teak	<i>Tectona grandis</i>

**CYPERACEAE**

Boru Pan	<i>Eleocharis dulcis</i>
----------	--------------------------

**BAMBUSACEAE**

Rana bata	<i>Ochlandra stridula</i>
Nala Bata	<i>Bambusa sp</i>

**NYMPHAEACEAE**

Manel	<i>Nymphaea stellata</i>
Nelum	<i>Nelumbium speciosum</i>
Sudu Nelum	<i>Nelumbium sp</i>
Sudu Olu	<i>Nymphaea lotus</i>

**ARACEAE**

Ketala	<i>Lagenandra ovata</i>
--------	-------------------------

**MYRTACEAE**Dan *Syzygium caryophyllatum***APONOGETONACEAE**Kekatiya *Aponogeton crispus***GENTIANACEAE**Olu *Nymhoides hydrophyllum***FLACOURTIACEAE**Katu lovi *Flacourta inermis***RUBIACEAE**Heen Kumudu *Paederia sp***7 Faunal Check-lists recorded in project area****Reptiles - SNAKES****TYPHLOPIDAE***Ramphoryphlops braminus***UROPELTIDAE***Cylindrophis maculatus* \***COLUBRIDAE***Elaphe helena**Lycodon aulicus**Ptyas mucosus**Dendrelaphis tristis**Dendrelaphis bifrenalis**Ahaetulla nasutus**Amphiesma stolata**Atretium schistosum**Oligodon arnensis**Oligodon sublineatus* \**Xenochrophis piscator**Lycodon striatus**Lycodon osmanhulli* \**Xenochrophis asperrimus* \**Sibynophis subpunctatus**Cerberus rhynchops**Boiga Ceylonensis***ELAPIDAE***Naja Naja**Pelamie platurus**Bungarus caeruleus**Leiocelasma spiralis***VIPERIDAE***Vipera russelli**Hypanale hypanale**Trimeresurus trigonocephalus* \***BOIDAE***Python molurus***ACROCHORDAE***Acrochordus granulatus***Tetrapods****Common Name****GEKKONIDAE**

Common Spotted Gecko

House Gecko

White House Gecko

**VARANIDAE**

Water Monitor

Land Monitor

**BATAGARIDAE**

Pond Terrapin

**AGAMIDAE**

Green Garden Lizard

Common Sand Lizard

Earless Lizard

**TRIONYCHYIDAE**

Soft Shelled Turtle

**CROCODYLIDAE**

Swamp Crocodile

Estuarine Crocodile

**Zoological Name***Hemidactylus brookii**Hemidactylus frenatus**Gehyra mutilata**Varanus salvator**Varanus cepedianus**Melanochelys trijuga**Calotes calotes**Calotes versicolor**Otocryptus wiegmanni* \**Lissemys punctata**Crocodylus palustris**Crocodylus porosus*

**Tetrapods (continued)**

**SCINCIDAE**

Common Skink  
Brown Skink  
Red Tailed Skink  
Layard's Snake Skink

*Mabuya carinata*  
*Lankascincus fallax* \*\*  
*Lygosoma punctatum*  
*Nessia lavardi* \*\*

**Amphibians**

**BUFONIDAE**

*Bufo kelaarti* \*  
*Bufo melanostictus*

**RANIDAE**

*Rana temporalis*  
*Euphlyctis cyanophlyctis*  
*Limnonectes limnocharis*

**RHACOPHORIDAE**

*Polypedates cruciger*  
*Polypedates maculatus*  
*Philautus sp (a)*  
*Philautus sp*

**Butterflies**

**Common name**

**DANAIDAE**

Common Indian Crow  
Glassy Tiger  
Common Tiger  
Plain Tiger  
Blue Admiral  
Common Castor  
Tawny Castor

**SATYRIDAE**

Common Palmfly  
White Four ring  
Nigger  
Common Albatross  
Lemon Migrant  
Small Grass Yellow  
Common Grass Yellow  
Three Spot Grass Yellow  
Great Orange Tip

**Zoological Name**

*Euploea core*  
*Parantica aglea*  
*Danaus genutia*  
*Danaus chrysippus*  
*Kanska canace*  
*Ariadne merione*  
*Telchmia violae*  
  
*Elymnias hypermnestra*  
*Ypthima ceylonica*  
*Orsotriaena medus*  
*Appias albina*  
*Catopsilia pomona*  
*Eurema brigitta*  
*Eurema brigitta*  
*Eurema blanda*  
*Hebomoia glaucippe*

**Common Name**

**Nymphalidae**

Clipper \*  
Common Sailor  
Peacock Pansy  
Grey Pansy

**PIERIDAE**

Psyche  
Dark Wanderer  
Common Gull

**Lesser Albatross**

**PAPILIONIDAE**

Crimson Rose  
Blue Morman  
Common Morman  
Lime Butterfly  
Common Blue Botle  
Common Jay  
Tailed Jay

**Zoological Name**

*Parthenos sylvia*  
*Neptis hylas*  
*Junonia almana*  
*Junonia atltes*  
  
*Leptostia nina*  
*Pareronomia ceylanica*  
*Cepora nerissa*  
*Appias paulina*  
  
*Pachliopta hector*  
*Papilio polymnestor*  
*Papilio polytes*  
*Papilio demoleus*  
*Graphium sarpedon*  
*Graphium doson*  
*Graphium agamemnon*

**Fresh Water - fish**

**Common Name**

**CYPRINIDAE**

Horadandiya  
Scarlet banded Barb  
Log snouted Barb  
Filamented Barb  
Swamp Barb  
Red-side Barb  
Striped Rasbora  
Giant Danio  
Caveru Rasbora  
Silver Barb  
Silver Carplet

**Zoological Name**

*Horadandia atukorali*  
*Puntius amphibius*  
*Puntius dorsalis*  
*Puntius filamentosus*  
*Puntius chola*  
*Puntias bimaculatus* \*  
*Rasbora daniconius*  
*Danio malabaricus*  
*Rasbora caveru*  
*Puntius vittatus*  
*Amblypharyngodon meletinus*

65

Fish (continued)

<b>COBOTTIDAE</b>	
Common Spiny Loach	<i>Lepidocephalichthys thermalis</i>
<b>MEGALOPIDAE</b>	
Tarpon	<i>Megalops cyprinoides</i>
<b>ANGUILLIDAE</b>	
Level finned Eel	<i>Anguilla bicolor</i>
Long finned Eel	<i>Anguilla nebulosa</i>
<b>BAGRIDAE</b>	
Long Whiskered Catfish	<i>Mystus gulio</i>
Stripped Dwarf Catfish	<i>Mystus vittatus</i>
<b>SILURIDAE</b>	
Butter Catfish	<i>Ompok bimaculatus</i>
<b>CLARIIDAE</b>	
Walking Catfish	<i>Clarias brachysoma</i> *
<b>HETERODNEUSTIDAE</b>	
Stinging Catfish	<i>Heteropneustes fossilis</i>
<b>HEMIRAMHIDAE</b>	
Viviparous Halfbeak	<i>Zenarchopterus dispar</i>
<b>ORYSIIDAE</b>	
Blue Eye	<i>Oryzias melastigma</i>
<b>APLOCHEILIDAE</b>	
Day's Killifish	<i>Aplocheilichthys dayi</i> *
Dwarf Panchax	<i>Aplocheilichthys parvus</i>
Werner's Killifish	<i>Aplocheilichthys wernerii</i> *
<b>POECILIIDAE</b>	
Guppy	<i>Poecilia reticulata</i>
Platy	<i>Xiphophorus maculatus</i>
<b>SYNGNATHIDAE</b>	
Short tailed Pipefish	<i>Microphis brachyurus</i>
<b>CENRODOMIDAE</b>	
Barramundi	<i>Lates calcarifer</i>
Common Glassfish	<i>Ambassis commersoni</i>
<b>LUTJANIDAE</b>	
Red Snapper	<i>Lutjanus argentimaculatus</i>
<b>MONODACTYLIDAE</b>	
Mono	<i>Mondactylus argenteus</i>
<b>TOXOTIDAE</b>	
Archer fish	<i>Toxotes chatareus</i>
<b>SCATOPHAGIDAE</b>	
Scat	<i>Scatophagus argus</i>
<b>CICHLIDAE</b>	
Orange Chromide	<i>Etroplus maculatus</i>
Pearl Sport	<i>Etroplus suratensis</i>
Tilapia	<i>Sarotherodon mossambicus</i>
<b>ELEOTRIDAE</b>	
Upside Down Sleeper	<i>Butis butis</i>
Brown Gudgeon	<i>Eleotris fusca</i>
<b>GOBIDAE</b>	
Bar Eyed Goby	<i>Glossogobius giuris</i>
Rhino horn Goby	<i>Redigobius balteatops</i>

**Fish (continued)**

**ANABANTIDAE**

Climbing Perch

*Anabus testudineus*

**BELONTIIDAE**

Spike tailed ParadiseFish

*Pseudosphronemus cupanus*

Snakeskin Gourami

*Trichogaster pectoralis*

Three Spot Gourami

*Trichogaster trichopterus*

**HELOSTOMATIDAE**

Kissing Gourami

*Helestroma temminckii*

**OSPHRONLEMIDAE**

Giant Gourami

*Osphronemus goramy*

**CHANNIDAE**

Giant Snakehead

*Channa marulius*

Smooth Breasted Snakehead

*Channa orientalis* \*

Spotted Snakehead

*Channa punctata*

Murrel

*Channa Striata*

**MASTACEMBELIDAE**

Marbled Spiny Eel

*Mastacembelus armatus*

**TETRAODONTIDAE**

Common Puffer

*Tetraodon fluviatilis*

**Mammals**

**SORICIDAE**

Musk Shrew

*Suncus murinus*

**PTEROPODIDAE**

Flying Fox

*Pteropus giganteus*

Short Nosed Fruit Bat

*Cyanopterus sphinx*

**VESPERTILIONIDAE**

Pigmy Bat

*Pipistrellus mumus*

**LORISIDAE**

Slender Loris

*Loris tardigradus*

**CERCOPITHECIDAE**

Grey Langur

*Presbytis entellus*

Purple-faced Leaf Monkey

*Presbytis senex* \*

**CANIDAE**

Jackal

*Canis aureus*

Dog

*Canis familiaris*

**MUSTELIDAE**

Otter

*Lutra lutra*

**VIVERRIDAE**

Small Civet

*Viverricula indica*

Common Palm Cat

*Paradoxurus hermaphroditus*

Brown Mongoose

*Herpestes fuscus*

**SCIURIDAE**

Palm Squirrel

*Funambulus palmarum*

**MURIDAE**

Indian Bandicoot

*Bandicota indica*

Field Mouse

*Mus cervicolor*

Common House Rat

*Rattus rattus*

Lesser Bandicoot

*Bandicoota bengalensis*

Indian House Mouse

*Mus musculus*

**Mammals (continued)**

**HYSTRICIDAE**

Porcupine

*Hystrix indica*

**LEPORIDAE**

Black Naped Hare

*Lepus nigricollis*

**FELIDAE**

Rusty Spotted Cat

*Felis rubiginosa*

Fishing Cat

*Felis viverrina*

Domestic Cat

*Felis catus*

**MANIDAE**

Pangolin

*Manis crassicaudata*

**TRAGULIDAE**

Mouse Deer

*Tragulus meminna*

**BOVIDAE**

Water Buffalo

*Bubalus bubalus*

Domestic Cattle

*Bos indicus*

Domestic Goat

*Ovis aries*

**Birds**

**CORVIDAE**

Village Crow

*Corvus splendens protegatus*

Black Crow

*Corvus macrorhynchos culminatus*

**PODICIPEDIDAE**

Indian Little Grebe

*Tachybaptus ruficollis*

**PELICANIDAE**

Spotted Billed Pelican

*Pelecanus philippensis*

**PHALACROCORACIDAE**

Indian Cormorant

*Phalacrocorax carbo-sinensis*

Indian Shag

*Phalacrocorax fuscicollis*

Little Cormorant

*Phalacrocorax niger*

**PITTIDAE**

Indian Pitta

*Pitta brachyura brachyura*

**PYCNONOTIDAE**

Red vented Bulbul

*Pycnonotus cafer haemorrhousus*

Black Capped Bulbul

*Pycnonotus melanicterus*

White Browed Bulbul

*Pycnonotus luteolus insulae*

Black Bulbul

*Hypsipetes leucocephalus*

**MUSCICAPIDAE**

Sri Lanka BrownCapped Babbler

*Pellorneum fuscocapillum scortillum*

Black Robin

*Saxicoloides fulcata leucoptera*

Southern Magpie Robin

*Copsychus saularis ceylonensis*

Common Black fronted Babbler

*Rhopocichla atriceps nigrifrons*

White Headed Babbler

*Turdoides affinis taprobanus*

Asian Paradise Flycatcher

*Terpsiphone paradisi*

Brown Fly Catcher

*Muscicapa daurica*

Indian streaked Fantail

*Cisticola juncidis cursitans*

Common Wren Warbler

*Prinia inornato*

Ashy Prinia

*Prinia socialis brevicauda*

Large Prinia

*Prinia sylvatica valida*

Tailor Bird

*Orthotomus sutorius sutorius*

**CICONIIDAE**

Open-Bill Stork

*Anastomus oscitans*

Painted Stork

*Mycteria leucocephala*

Birds (continued)

**THRESKIORNITHIDAE**

White Ibis

*Threskiornis melanocephalus*

**ANATIDAE**

Lesser Whistling Teal

*Dendrocygna javanica*

Garganey Teal

*Anas querquedula*

**RALLIDAE**

White Breasted Water Hen

*Amaurornis phoenicurus*

Water Cock

*Gallixrex cinerea*

Indian Moorhen

*Gallinula chloropus indica*

Purple Coot

*Porphyrio porphyrio*

**LANIIDAE**

Brown Shrike

*Lanius cristatus cristatus*

Philippine Shrike

*Lanius cristatus lucionensis*

**ORLIDAE**

Large Cuckoo Shrike

*Coracina macei*

Orange Minivet

*Pericrocotus flammeus*

Little Minivet

*Pericrocotus cinnamomeus*

Black Headed Oriole

*Oriolus xanthornus ceylonensis*

**STURNIDAE**

Common Mynah

*Acridotheres tristis*

**DICRURIDAE**

Pale-white vented Drongo

*Dicrurus caerulescens leucopygiahs*

Black Drongo

*Dicrurus macrocercus*

**JANICANIDAE**

Pheasant-tailed Jacana

*Hydrophasianus chirurgus*

**ROSTRATULIDAE**

Painted Snipe

*Rostratula benghalensis*

**RECURVIROSTRIDAE**

Black Winged Stilt

*Himantopus himantopus*

**CHARADRIIDAE**

Red Wattled Lapwing

*Vanellus indicus lankae*

Eastern Golden Plover

*Pluvialis fulva*

Wood Sandpiper

*Tringa stagnatilis*

Common Sandpiper

*Actitis hypoleucos hypoleucos*

Pintail Snipe

*Gallnago stenura*

**LARIDAE**

Indian Whiskered Tern

*Chlidonias hybridus hybridus*

Gull-bellied Tern

*Sterna nilotica nilotica*

Little Tern

*Sterna albifrons sinensis*

**HIRUNDINIDAE**

Eastern Swallow

*Hirundo rustica gutturalis*

Red Rumped Swallow

*Hirundo daurica hypererythra*

**ZOSTEROPIDAE**

Oriental White Eye

*Zosterops palpebrosus*

**NECTARINIIDAE**

Loten's Sunbird

*Nectarinia lotenia lotenia*

Purple Sunbird

*Nectarinia asiatica asiatica*

Purple Rumped Sunbird

*Nectarinia zeylonica zeylonica*

**PICIDAE**

Yellow Naped Wood Pecker

*Picus chlorolophus*

Red Backed Wood Pecker

*Dinopium benghalense*

**Birds (continued)**

**CORACIDAE**

Indian Roller

*Coracias bengalensis*

**MEROPIDAE**

Ceylon Green Bee Eater

*Merops orientalis*

Chestnut headed Bee Eater

*Merops leschenaulti*

Blue tailed Bee Eater

*Merops philippinus philippinus*

**ALCEDINIDAE**

Common Kingfisher

*Alcedo atthis taprobana*

Three toed Kingfish

*Ceyx erithacus*

Indian Pied Kingfisher

*Ceryle rudis leucomelanura*

Stork Billed Kingfisher

*Pelargopsis capensis capensis*

Indian White Breasted Kingfisher

*Halcyon smyrnensis fusca*

**CUCULIDAE**

Pied Crested Cuckoo

*Oxylophus jacobinus jacobinus*

Indian Plaintive Cuckoo

*Cacomantis passerinus*

Indian Koel

*Eudynamys scolopacea*

Southern Coucal

*Centropus sinensis parroti*

**CAPITONIDAE**

Green Barbet

*Megalaima zeylanica zeylanica*

Sri Lanka Yellow Fronted Barbet

*Megalaima flavifrons*

Sri Lanka Small Barbet

*Megalaima rubricapilla*

Crimson-Breasted Barbet

*Megalaima haemacephala*

**ARTAMIDAE**

Ashy Swallow Shrike

*Artamus fuscus*

**MOTACILLIDAE**

Indian Pipit

*Anthus rufulus*

**DICAEIDAE**

Tickell's Flowerpecker

*Dicaeum erythrorhynchos ceylonense*

**STRIGIDAE**

Indian Brown Hawk Owl

*Ninox scutalata hirsuta*

**CAPRIMULGIDAE**

Common Nightjar

*Caprimulgus asiaticus eidos*

**PSITTACIDAE**

Alexandrine Parakeet

*Psittacula eupatria eupatria*

Southern Rose-Ringed parakeet

*Psittacula krameri manillensis*

Sri Lanka Lorikeet

*Loriculus beryllinus*

**ACCIPITRIDAE**

Brahminy Kite

*Haliaeetus indus indus*

Serpent Eagle

*Spilornis cheela*

White-bellied Sea Eagle

*Haliaeetus leucogaster*

Shikra

*Accipiter badius badius*

Montague's Harrier

*Circus pygargus*

Marsh Harrier

*Circus aeruginosus*

Booted Eagle

*Hieraaetus pennatus*

**COLUMBIDAE**

Pompadour green pigeon

*Treron pompadora*

Bronze wing pigeon

*Treron bicincta*

Spotted Dove

*Streptopelia chinensis*

Indian Ringed Dove

*Streptopelia decaocto*

**Birds (continued)**

**IRENIDAE**

Ceylon Iora

*Aegithina tiphia multicolor*

**ARDEIDAE**

Pond Heron

*Ardeola grayii*

Cattle Egret

*Bubulcus ibis*

Eastern Purple Heron

*Ardea purpurea manilensis*

Eastern Large Egret

*Casmerodius albus*

Little Green Heron

*Butorides striatus javanicus*

Lesser Egret

*Mesophoyx intermedia intermedia*

Little Egret

*Egretta garzetta garzetta*

Night Heron

*Nycticorax nycticorax*

Malay Bittern

*Gorsachius melanolophus*

Chestnut Bittern

*Ixobrychus cinnamomeus*

Little Yellow Bittern

*Ixobrychus sinensis*

Black Bittern

*Ixobrychus flavicollis flavicollis*

**PLOCEIDAE**

Spotted Munia

*Lonchura punctulata punctulata*

Black Headed Munia

*Lonchura malacca*

**UPUPIDAE**

Hoopoe

*Upupa epops*

**Co-ordinator - Noel Vithanage, NSRC with  
Prassana Weerakody, Nature Conservation Group**

**Locations: Coastal eco-zone, Rumassala, Galle**

- (1) Buona Vista Coral Reef and the**
- (2) Mangrove surrounding reef area called Weggal Modara**

**Introduction**

The coral reefs in Sri Lanka are under severe threat and it is understood that the reefs cannot survive the rate of mechanical and pollution-based destruction they are being subjected to unless deliberate attempts are made to restore and rehabilitate them. The Buona-vista reef in Rumassala, Galle was selected as the reef that has the highest bio-diversity, and that which has also suffered from recent crises involving a storm surge and an infestation of Ascidiarians, both phenomena killing sections of the reef. The reef is also an ideal candidate for this type of project as it is well documented (Karunaratne & Weerakkody/ Natcog 1993-1994) with baseline data to initiate restoration.

As sufficient data is available on restoration methodologies, during the first season of the project, several experiments were carried out to test the ability of introduced coral nuclei to re-colonize damaged sections of reefs. The aim was to identify species that would best survive different conditions and also to establish the rate of re-attachment of nuclei to the reef substrate.

The pilot survey was considered successful with most objectives being fulfilled. Unfortunately the phenomenon of 'Global Warming' associated with the 1998 *El-nino* created severe coral bleaching and considerable coral death in the central Indian Ocean region including the Maldives, India and Sri Lanka. The reef suffered 25 - 35% coral death in this event including the areas of the experiment. Though the restored coral plot was lost, the knowledge has given us confidence that restoration is viable in reef environments. With the considerable coral death caused by the *El-nino*, the importance of such an exercise becomes more pronounced.

The reef is also used by 6 divers supplying the ornamental aquarium trade. In addition, 7-12 divers collect Spiny lobsters for the food fish export trade. 5-10 fishermen using hooks and lines and 8 - 12 fishermen deploy gill nets on and around the reef periphery. At least 4 individuals engage in illegal and highly destructive fish dynamiting occasionally.

Many special diving tours are operated to the reef from Unawatuna, Cloisenburg Hotel in Galle and from Hikkaduwa.

The reef has also become one of the best known reefs and a preferred location for many educational explorations by Schools and Universities as well as large numbers of recreational visitors.

The benefit to the community is indirect, as improved reef health will invariably lead to improved fisheries and eco-tourism potential.

Links have been established with the village temple, community leaders, the Catholic Church of the area and major Hoteliers in order to increase awareness and promote the conservation of the reef and its surrounding areas.

During the months of the year when deep sea diving cannot be undertaken due to the turbulent seas and the bad weather conditions, the team conducts research and community awareness programmes in and around the mangrove areas surrounding the reef. The Rumassala coral reef mangrove habitat creates an ideal breeding ground for the growth and the feeding of juveniles of the Rumassala coral reef fish species. The communities of people living in these mangrove areas earn their livelihood either mining coral or selling ornamental fish. One of the objectives of this project is to promote some of the crops growing in these areas which have a commercial value as forest garden crops. By the sale of these mangrove forest crops, the people in this community could find an alternative, much less destructive way of earning their livelihood as well as conserving these precious forests.

## 1 Number of persons, male and female from the communities living in the Mangrove area in Weggal Modara

Males	-	8
Females	-	4
Total	-	12

## 2 Extent of Project areas

### Coral Reef

The total area of the reef is approximately 10 Ha (500 m x 200 m), the area of reef used in the restoration experiment is approximately 30m x 50m

### Mangrove Area – Weggal Modara

Total land covered - 8 square km (approximately)

## 3 Monthly Income – Mangrove Area (Weggal Modara)

Total monthly income of 12 families – Rs 43,450 00

## 4 Summary of Activities

### December 1997 to January 1998

Bonavista coral reef is located on the eastern corner of Galle Bay in the south of Sri Lanka. This covers an area of 500 x 200 m. The middle area of the coral reef was physically damaged by the force of the waves during the monsoon in 1996. Thereafter the weak structure of the coral suffered a sudden increase in population of reef organisms called (*Ascidians*) which caused more destruction to the reef.

Our first activity was to survey the areas of the reef which had been destroyed and demarcate them by the placement of buoys (84 m x 26 m). We identified the nuclei suitable for rehabilitation and replaced these in the first quadret (1m x 1m) which had been selected for the experiment.

### January 1998 – March 1998

Completed the identification & mapping of the areas to be rehabilitated.

Laid corals in an area of 25 m x 25 m. 4 species of corals were planted of which *Acropora formosa*, and *Acropora hyacinthus* predominated. The 'clowns' planted were of different sizes 250 to 260 pieces of coral were planted in the crevices of the reef. Out of the first lot planted, 32 pieces of coral, mainly of *Acropora formosa* were established.

People living on the mountain area fringing the Rumassala reef earn their livelihood from the reef by fishing using dynamite and by collecting ornamental fish. Dynamiting the coral reef, needless to state, causes an incredible amount of destruction and since we commenced our project, there seems to be a decrease in the use of dynamite. The ornamental fish collectors on the other hand, use the 'moksy net' which is installed with the help of iron rods embedded into the reef. This leads to the destruction of the reefs. After constant dialogue, the villagers have agreed not to collect the breeding stocks of fish and to 'wrap' their nets around bigger coral boulders instead of nailing them onto the reef.

Errant local and foreign visitors also are responsible for littering the reef by strewing polythene and other non-biodegradable material on the reef. In addition they walk along the reef when it is exposed at low tide, this causes damage to the coral. With the help of the village youth, we are requesting visitors to move off the reef.

Further to the coral planting activity, we have commenced environmental education classes for village youth as well as science classes for those youth who intend to sit for their O/L examination.

Mapping of areas where coral has been grafted, is in progress

We have planned to install Notice Boards to educate visitors and a 'Reef Cleaning' campaign involving schools of the area, NGO's, Government organizations and villagers

We urgently require more literature to facilitate the identification of species of coral as well as a depth-gauge in order to continue with our work.

### March 1998

The 'Reef Cleaning' campaign began on the 28<sup>th</sup> of March in Rumassala. The main aim of the 'Reef Cleaning' Campaign is to raise the awareness of villagers, tourists and people from other areas to conserve the reef, and to enlist their support in removing the garbage that has accumulated on the reef and on the beach

Many persons from the media were invited and those who attended were as follows

Sri Lanka Rupavahini (Television)

Young Asia (Television)

Lakbima (Newspaper)

Diwana (Newspaper)

Lankadeepa (Newspaper)

Sirasa (Radio)

Lakhanda (Radio)

Posters were put up to inform the villagers. Schools in the immediate vicinity were visited and their Principals informed. The following schools participated

Buonavista School - Rumassala

Sanghamitta Girls School - Galle

Richmond College - Galle

Mahinda College - Galle

Southlands Girls School - Galle

The following Government and Non Government institutions participated.

The Sri Lanka Navy - Galle Naval Base

The Police Station - Habaraduwa

The Fisheries Training School - Negombo

Turtle Conservation Project - Rekawa

Coast Conservation Movement - Magalla

Young Zoologists Association - Dehuwela

The Movement for a New Way of Life, Rumassala

Closenberg Hotel - Magalla

The team was split into 3 groups, 28 members who could swim removed the garbage off the reef. 31 members removed the garbage from the beach which spanned an area of about 2 kilometres. A third team dug a pit of 5' x 5' x 6' to bury the garbage.

Approximately a mass of 950 kilograms of non biodegradable matter such as rubber, polythene and plastic was removed and disposed off.

4 'information' boards were mounted by the path to the beach in order to attract the attention of both, foreign and local visitors.

#### April 1998

Coral clumps planted in the reef were continuously monitored and significant behavior was observed. Two *Gobies* were spotted occupying a recently planted coral clump of *Acropora formosa*. The coral re-planting process was continuously examined and 80 pieces were found to have established.

The bleaching of the coral was found to have occurred in several places in the reef. The bleaching is apparently caused by the *El-nino* conditions which increase the surface water temperatures causing the *Coralites* and the symbiotic *Zoosanthae* to break away from their usual habitats, straying away or dying within themselves. This destroys their natural color and results in their becoming almost white. The coral bleaching continued with great speed and by the 7<sup>th</sup> May reached almost to a depth of about 8'. Unfortunately, the complete bleaching of the corals rehabilitated by our Project was observed.

There was no decrease in the fish returning to the coral reef during this period, but a significant decrease in the numbers of specific species of fish was noted during this intense coral bleaching period. Due to the natural changes in the environment that occur during the period of the south west monsoons, there is a hope that this bleaching of corals would be contained.

We commenced studies on the mangroves surrounding the reef with the assistance of the villagers living in the area. We found out that the Ruhunu University had already commenced a research program on the mangroves.

The Ruhunu Cement factory borders this mangrove forest, and it releases its effluents into this area.

The villagers destroy the mangrove forests for the purposes of cultivation, collecting firewood and fishing. Fish, prawns and crabs are harvested from these areas. Our aim is to restore this mangrove forest, by re-planting the specific mangrove tree species that are being cut. We are also hoping to grow the tree species required for the needs of the villagers in their home gardens in order to minimize the destruction of these mangrove habitats.

In addition to the extra tuition classes given to the village children, library facilities are being offered to those students so that they improve their environmental knowledge.

#### May 1998

By this time the coral bleaching had reached its maximum level, the south-west monsoon arrived where heavy rains and stormy conditions prevailed. The sea water is not very clear and from the observations made, we found that some coral species are recovering from the effects of the bleaching whereas others had completely died off – e.g. *Acropora hyacinthus*.

A special species of algae, brown in colour and having very soft bristles has grown on the coral species.

By the beginning of May, the visibility of the sea water has decreased and only 1 – 3 feet of the reef was visible. The ongoing work at the bottom of the sea was temporarily halted.

From our beach observations, a great quantity of sand has been blown in to the sea, up-rooting the coral pieces placed under the sand. In addition, many pieces of coral had been washed ashore.

8 students are attending the extra-classes in science subjects conducted every Friday in the premises of the Rumassala Buonavista Church, in addition to the lessons given in environmental studies.

2 special species of shark were noticed and one of them identified as *Sphyrna lewini*.

## FAUNAL CHECKLIST RECORDED IN PROJECT AREA

The reef contains a recorded bio-diversity of over  
530 species of fish  
372 recorded species of invertebrates belonging in 11 Phyla, including 148 species of Molluscs  
98 species of Crustacea,  
83 species Coelenterates including over 70 species of Hard coral,  
43 species of Echinodermates and other minor taxa,  
The Green, Leatherback and Hawksbill Sea Turtles  
A pair of resident White bellied Sea Eagles  
Rare Black capped Purple Kingfisher,  
At least two species of corals new to science have been recorded from the reef

The TEM Counterpart project in Rumassala has recorded the following marine fish species

### CARCHAINIDAE

*Carcharinus melanopterus* (Jnr)

### DASYATIDAE

*Dasyatis kuhli*  
*Epinephelus merra*

### MURAENIDAE

*Echidna nebulosa*  
*Gymnophoray javanicus*  
*Paracirrhites areatus*

### PLOTOSIDAE

*Plofusus lineatus*

### BELOWIDAE

*Strongylura incisa*

### HEMIRHAMPHIDAE

*Hemiramphus far*

### HOLOCENTRIDAE

*Myripristis odusta*  
*Myripristis violacea*  
*Neomiphon sammara*  
*Sargocentron spiniferum*

### ANOMALOPIDAE

*Fistuloria commersoni*

### SYNGNATHIDAE

*Doryramphus excisus*  
*Hippocampus kuda*  
*Scolopsis vosmeri*

### SCORPAENIDAE

*Scorpenopsis diabolus*  
*Scorpenopsis oxycephala*  
*Pterois radiata*  
*Pterois miles*  
*Pterois omtennata*

### SERRADIDAE

*Cephalapholis formosa*  
*Cephalapholis argus*  
*Epinephelus cacruleopunctatus*  
*Epinephelus fasciatus*  
*Grammistes sexlineatus*

### CIRRHITIDAE

*Paracirrhites forsteri*  
*Cirrhichthys oxycephalus*

### THERAPONIDAE

*Terapon jarbua*

### GERREIDAE

*Gerres oyena*

### LUTJANIDAE

*Lutjanus decussatus*  
*Lutjanus kasmira*  
*Lutjanus fulviflamma*  
*Lutjanus fulvus*  
*Lutjanus bohar*

### HAEMULIDAE

*Plectorhynchus gibbosus*  
*Plectorhynchus vittatus*

### NEMIPTERIDAE

*Scolopsis bimaculatus*

### LETHRINIDAE

*Monofaxis grandoculis*  
*Lethrinus harak*  
*Lethrinus nebulosus*

**MULLIDAE**

*Mulloidichthys flavoventer*  
*Mulloidichthys vanicolensis*  
*Parupeneus barberinus*  
*Parupeneus macronema*  
*Parupeneus indicus*  
*Parupeneus bifasciatus*  
*Parupeneus cyclostomus*  
*Plectroglyphidodon dickii*

**CHAETODONTIDAE**

*Chaetodon lineolatus*  
*Chaetodon falcata*  
*Chaetodon melannotus*  
*Chaetodon vagabundus*  
*Chaetodon auriga*  
*Chaetodon decussatus*  
*Chaetodon ummaculatus*  
*Chaetodon pleberus*  
*Chaetodon kleini*  
*Chaetodon xanthocephalus*  
*Chaetodon lunula*  
*Chaetodon rafflesi*  
*Chaetodon guttatissimus*  
*Chaetodon citrinellus*  
*Chaetodon collare*  
*Chaetodon triomgulum*  
*Chaetodon trifasciatus*  
*Chaetodon meyeri*  
*Chaetodon ephippium*  
*Chaetodon trifasciatus*  
*Hemiochus acuminatus*  
*Hemiochus pleurotaenia*

**SPHYRAENIDAE**

*Sphyræna barracuda*  
*Sphyræna flavicauda*

**POMACANTHIDAE**

*Centropyge multispinis*  
*Centropyge flaviventralis*  
*Pomacanthus annularis*  
*Pomacanthus semicirculatus*  
*Abudefduf vaigiensis*  
*Abudefduf sexfasciatus*  
*Abudefduf sordidus*

*Plectroglyphidodon phoenixensis*

*Dascyllus melanurus*

**LABRIDAE**

*Bodianus axillaris*  
*Cheilinus chlorourus*  
*Halichoeres hortulanus*  
*Halichoeres marginatus*  
*Halichoeres scapularis*  
*Halichoeres nebulosus*  
*Halichoeres margaritaceus*  
*Halichoeres timorensis*  
*Hamigymnus fasciatus*  
*Hamigymnus melapterus*  
*Gomposus caeruleus*  
*Thalassoma lunara*  
*Thalassoma jansen*  
*Thalassoma hardwicke*  
*Labrichthys unilineatus*  
*Labroides bicolor*  
*Labroides dimidiatus*  
*Scarus rubroviolaceus*  
*Scarus ghobbum*

**MATCHING CONTRIBUTIONS**

- 2 Pairs Snorkeling Gear
- Inflatable Boat
- Underwater Compass

**TRAINING PROGRAMS / COMMUNITY AWARENESS**

The team comprises of 3 members and has been trained in marine survey methodologies, basic marine-life identification and snorkel/ scuba diving. The team works in co-operation with the Nature Conservation Group (NATCOG) consultants who have been studying the reef for many years. The team is engaged in training an additional 12 members in the field of marine eco-systems.

**PLANTS TO BE INCORPORATED IN LANDSCAPE DESIGN  
IN MANGROVE AREA – Weggal Modara**

<b>Common Name</b>	<b>Botanical Name</b>
Mahakadol	<i>Rhizophora mucronata</i>
Alstoma	<i>Alstoma scholaris</i>
Kirala	<i>Sonneratia caseolaris</i>
Mango	<i>Mangifera indica</i>
Jak	<i>Artocarpus heterophyllus</i>
Coconut	<i>Cocos nucifera</i>
Dan	<i>Syzygium caryophyllatum</i>

**POTENTIAL FOREST GARDEN PRODUCTS – MANGROVE AREA – Weggala Modara**

<b>Common Name</b>	<b>Botanical Name</b>
Kirala	<i>Sonneratia caseolaris</i>
Sudu Kirala	<i>Sonneratia alba</i>
Gin Pol	<i>Nipa fruticans</i>
Dan	<i>Syzygium caryophyllatum</i>

**FLORAL CHECKLIST**

**AT MANGROVE HABITAT- Weggal Modara)**

**RHIZOPHORACEAE**

Mahakadol	<i>Rhizophora mucronata</i>
Path Ulkenda	<i>Bruguiera gymnorhiza</i>
Punkanda	<i>Ceriops tagal</i>

**SONNERATIACEAE**

Kirala	<i>Sonneratia caseolaris</i>
--------	------------------------------

**COMBRETACEAE**

Thiththa Kohomba	<i>Lumnitzera racemosa</i>
------------------	----------------------------

**EUPHORBIACEAE**

Talakriya	<i>Excoecaria agallocha</i>
-----------	-----------------------------

**ACANTHACEAE**

Katu ikliya	<i>Acanthus illicifolius</i>
-------------	------------------------------

**STERCULIACEAE**

Ho Medriya	<i>Heritiera littoralis</i>
------------	-----------------------------

**POLYPODIACEAE**

Karan koku	<i>Acrostichum aureum</i>
------------	---------------------------

**BEGONIACEAE**

Gal Embula	<i>Begonia cordifolia</i>
------------	---------------------------

# A Report on the other activities of the Neo Synthesis Research Centre, the Nursery and the Uva Herbarium

## Neo Synthesis Research Centre

The Members of the Neo Synthesis Research Centre participated in the following national and international workshops and conferences

### CONFERENCES & WORKSHOPS

- A Conference to discuss the Impact of Intellectual Property Rights (IPR) regimes on Ayurvedic & Indigenous knowledge systems of Sri Lanka  
CISIR Colombo February 1998
- National Farmer Meeting  
NYSC Maharagama March 1998
- International Analog Forestry Meeting  
Lima, Peru June 1998
- Conservation of Bio-diversity in Agriculture  
Japan June 1998
- The Analog Forestry Data base Discussion with Mr John Jack of Monash University, Australia  
CISIR Colombo July 1998

### OTHER ONGOING PROJECTS

#### *Plant Nursery*

NSRC has perhaps, the largest and most diverse tree nursery in Sri Lanka. Not only is it a home for many species of endemic plants but it also houses and acts as an experimental station for exotic, tropical species of plants. One of the main functions of this nursery is that it generates the planting material required in the landscaping of farmer's gardens. In addition, it also performs the vital function of determining the methods of propagation for many rare forest species for which there is no known information. The nursery also sells some of its plants which enables it to earn a little of its operational expenses. A list of the trees that will be distributed to the Forest Garden Project is attached.

#### *The Uva Herbarium*

This is the commercial arm of NSRC which has been cultivating and marketing forest garden products actively in the Colombo markets for the past six years. In addition to cultivating crops on the premises of the Uva Herbarium, the organisation reaches out to an out-grower network in and around the Centre in Mirahawatte. The Uva Herbarium earned more than Rs 800,000.00 in the past year from the sales of forest garden products. A list of the existent and potential forest garden crops is attached.

### ***Rainforest Rescue***

This is a joint project between Rainforest Rescue International and the Neo Synthesis Research Centre. With the destruction of forests all over the world, many species of flora, in particular orchids and bromeliads are the first to go. This project seeks to conserve what it can whereby plants facing the danger of destruction are 'rescued' and given a home in the Analog forest at NSRC, Mirahawatte. A list of the plants formally transferred is attached.

### ***Developing an indigenous Certification system***

And ongoing process where we have concluded the final draft of the 'Systems and Procedures Manual' for the Certification of Forest garden Products

### ***Temple Forest Project – Wattarekkgoda Raja Maha Vihara***

A project jointly funded by the Community Environment Initiatives Facility (CEIF) of the Ministry of Forestry and Environment, Sri Lanka and Counterpart International, U S A.

### ***National Farmer Forum***

An ongoing dialogue between the farmers of Sri Lanka and the authorities responsible for agricultural policy. So far, three regional meetings have been held for farmers from the different areas in Sri Lanka as well as a National Farmer Meeting sponsored by the Consultative Group for International Agricultural Research (CGIAR). A formal statement on the views of the Sri Lankan Farmers was presented at the mid-term meeting of the CGIAR held in Brazil in May, 1998. Presently, we are in the process of setting up a Farmer Organisation that could continue to have regional and national level meetings in order to build up a strong network of farmers whose aim is to improve the lot of the Sri Lankan farmer.

### ***Kanneliya- Sinharaja Corridor Project -***

A joint project with Rainforest Concern, United Kingdom and the Ministry of Forestry and Environment, Sri Lanka where it is planned to set up a corridor between the two remaining large tracts of rain-forest in the south of Sri Lanka – Kanneliya and Sinharaja.

### ***Sri Lanka Conservation and sustainable use of Medicinal plants***

NSRC was appointed as a member on the Committee to safeguard the Intellectual Property Rights of Medicinal Plants by the creation of adequate legislation. This Project is funded by the World Bank and is being implemented by the Ministry of Health & Indigenous Medicine, Sri Lanka and the IUCN.

## **2 PLANTS AT THE NURSERY WHICH WILL BE DISTRIBUTED TO THE PROJECT**

<b>Common Name</b>	<b>Botanical Name</b>
Russian comfrey	
Ice Cream Bean	<i>Inga edulis</i>
Brazilian cherry	<i>Eugenia micheli</i>
Bamboo	<i>Bambusa vulgaris</i>
Tamarind	<i>Tamarindus indica</i>
Mango	<i>Mangifera indica</i>
Nikadaula	<i>Mehosma arnothiana</i>
Kududaula	<i>Neolitsea cassia</i>
Bulu	<i>Terminalia belerica</i>
Na	<i>Mesua nagassarum</i>
Orange	<i>Citrus aurantium</i>
Kotta	<i>Ceiba pentandra</i>

Plants (continued)

Durian	<i>Durio zibethinus</i>
Erythrina	<i>Erythrina poppegiana</i>
Hal	<i>Vateria acuminata</i>
Kaluwara	<i>Diospyros ebenenum</i>
Macadamia nut	<i>Macadamia ternifolia</i>
Lemon	<i>Citrus limon</i>
Madatiya	<i>denanthera paronina</i>
Asoka	<i>Saraca indica</i>
Kaha kona	<i>Cassia spectabilis</i>
Goraka	<i>Garcinia cambogia</i>
Ruk Athathana	<i>Alstonia scholaris</i>
Kurundu	<i>Cinnamomum zeylanicum</i>
Bin kohomba	<i>Munronia pumula</i>
Kokatya	<i>Garcinia terpnophylla</i>
Beli	<i>Aegle marmelos</i>
Wood apple	<i>Feronia elephanta</i>
Jak	<i>Artocarpus heterophyllus</i>
Wal karapincha	<i>Micromelum minutum</i>
Coffee	<i>Coffea robusta/arabica</i>
Aruda	<i>Ruta graveolens</i>
Cherimoya	<i>Annona cherimolia</i>
Katu anoda	<i>Annona muricata</i>
Avacado	<i>Persea americana</i>
Green Sapotae	<i>Lucuma viride</i>
Loquat	<i>Eriobotrya japonica</i>
Rambutan	<i>Nephelium lappaceum</i>
Kohomba	<i>Azadirachta indica</i>
Bora	<i>Ligustrum robustum</i>
Mara	<i>Albizia lebbbeck</i>
Jambu	<i>Syzygium jambos</i>
Hibiliya	<i>Antidesma buntus</i>
Damba	<i>Syzygium assimile</i>
Keena	<i>Calophyllum walkeri</i>
Phoenix Palm	<i>Phoenix robelleni</i>
Karapincha	<i>Murraya koenigi</i>
Koha palm	<i>Didymocarpus sp</i>
Royal palm	<i>Roystonea regia</i>
Neralu	<i>Elaeodendron glaucum</i>
Ambul Pera	<i>Psidium queneense</i>
Inga sp - small	<i>Inga sp</i>
Jambola	<i>Citrus grandis</i>
Pini Jambu	<i>Syzygium malaccensis</i>
Kumbuk	<i>Terminalia arjuna</i>
Kara	<i>Canthum coromandelicum</i>
Abiu	<i>Lucuma cainito</i>
Mora	<i>Euphoria longana</i>
Bu Kenda	<i>Mallotus albus</i>
Sapu	<i>Michelia champaca</i>
Fire Tree	<i>Schizolobium parahyba</i>
Erythrina poppegiana	<i>Erythrina sp</i>
Acacia	<i>Acacia sp</i>
Albizzia	<i>Albizzia sp</i>
Kekuna	<i>Aleurites triloba</i>
Toona	<i>Cedrella toona</i>

### 3 Existent and Potential Forest Garden Products

#### FRUITS, SPICES & FIBRE CROPS

Common Name	Botanical Name	Use
Goraka	<i>Garcinia cambogia</i>	Fruit
Passion Fruit	<i>Passiflora edulis</i>	Fruit
Papaw	<i>Carica papaya</i>	Fruit
Sweet Banana	<i>Musa sp</i>	Fruit
Ash Banana	<i>Musa sp</i>	Fruit
Anamalu	<i>Musa sp</i>	Fruit
Kolikuttu	<i>Musa sp</i>	Fruit
Avacado	<i>Persea gratissima</i>	Fruit
Ambarella	<i>Spondias dulcis</i>	Fruit
Lime	<i>Citrus aurantifolia</i>	Fruit
Sweet Orange	<i>Citrus aurantium</i>	Fruit
Sour Orange	<i>Citrus sp</i>	Fruit
Grape Fruit	<i>Citrus grandis var racemosa</i>	Fruit
Mandarin	<i>Citrus nobilis</i>	Fruit
Lemonine	<i>Citrus sp</i>	Fruit
Mango	<i>Mangifera indica</i>	Fruit
Bread Fruit	<i>Artocarpus nobilis</i>	Fruit
Jak	<i>Artocarpus heterophyllus</i>	Fruit
Nelli	<i>Phyllanthus embelica</i>	Fruit
Ice Cream Bean	<i>Inga edulis</i>	Fruit
Pomegranate	<i>Punica granatum</i>	Fruit
Durian	<i>Durio zibenthus</i>	Fruit
Rambutan	<i>Nepthelium longanum</i>	Fruit
Beli	<i>Aegle marmelos</i>	Fruit
Wood apple	<i>Feronia elephanta</i>	Fruit
Mangosteen	<i>Garcinia mangostana</i>	Fruit
Tree Tomato	<i>Cyphomandra betacea</i>	Fruit
Velvet Tamarind	<i>Dialium ovoideum</i>	Fruit
Guava	<i>Psidium guajava</i>	Fruit
Green Sapotae	<i>Lucuma viride</i>	Fruit
Apple	<i>Malus sylvestris</i>	Fruit
Pear	<i>Pyrus communis</i>	Fruit
Tumeric	<i>Curcuma domestica</i>	Seasoning
Ginger	<i>Zingiber officinale</i>	Seasoning
Cinnamon	<i>Cinnamomom zeylanicum</i>	Spice
Cloves	<i>Syzygium aromaticum</i>	Spice
Pepper	<i>Piper nigrum</i>	Spice
Cardomon	<i>Elletaria repens</i>	Spice
Nutmeg	<i>Myristica fragrans</i>	Spice
Cashew	<i>Anacardium occidentale</i>	Nut
Macadamia Nut	<i>Macadamia ternifolia</i>	Nut
Kithul Honey	<i>Caryota urens</i>	Palm syrup
Kithul Juggery	<i>Caryota urens</i>	Palm sugar
Sugar Cane	<i>Saccharum officinarum</i>	Sugar
Cocoa	<i>Theobroma cacao</i>	Beverage
Coffee	<i>Coffee robusta</i>	Beverage
Cane	<i>Calamus sp</i>	Fibre

## VEGETABLES

Cabbage	<i>Brassica oleracea</i>
Chinese Cabbage	<i>Brassica chinensis</i>
Red Cabbage	<i>Brassica oleracea capitata rubra</i>
Pak choi	<i>Brassica sp</i>
Knol khol	<i>Brassica caulorapa</i>
Broccoli	<i>Brassica oleracea gemmifera</i>
Turnip	<i>Brassica rapa</i>
Cauliflower	<i>Brassica oleracea botrytis</i>
Lettuce	<i>Lactuca sativa</i>
Red Lettuce	<i>Lactuca sp</i>
Iceburg Lettuce	<i>Lactuca sp</i>
Leeks	<i>Allium porrum</i>
Beetroot	<i>Beta vulgaris</i>
Capsicum Pepper	<i>Capsicum sp</i>
Bell Pepper	<i>Capsicum grossum</i>
Red Pepper	<i>Capsicum sp</i>
Tomato	<i>Lycopersicum esculentum</i>
Cherry Tomato	<i>Lycopersicum sp</i>
Spinach	<i>Basella alba</i>
Celery	<i>Apium graveolens</i>
Okra	<i>Hibiscus esculentus</i>
Thampala	<i>Amaranthus sp</i>
Carrots	<i>Daucus carota</i>
Radish	<i>Raphanus sativus</i>
Red Radish	<i>Raphanus sp</i>
Beans	<i>Phaseolus vulgaris var</i>
Winged Beans	<i>Psophocarpus tetragonolobus</i>
Karawila	<i>Momordica charantia</i>
Chervil	<i>Anthriscus sylvestris</i>
Kathurumurunga	<i>Sesbania grandiflora</i>
Aubergine	<i>Solanum melongena</i>
Tibbatu	<i>Solanum indicum</i>
Telum Batu	<i>Solanum sp</i>
Kiri ala	<i>Colocasia sp</i>

## HERBS (CULINARY)

Sweet Basil	<i>Ocimum basilicum</i>
Lemon Basil	<i>Ocimum sp</i>
Purple Basil	<i>Ocimum sp</i>
Red Basil	<i>Ocimum sp</i>
Italian Basil	<i>Ocimum sp</i>
Parsley	<i>Petroselinum sativum</i>
Italian Parsley	<i>Petroselinum sp</i>
Sage	<i>Salvia officinalis</i>
Rosemary	<i>Rosmarinus officinalis</i>
Lavender	<i>Lavandula</i>
Dill	<i>Peucedanum graveolens</i>
Marjoram	<i>Origanum vulgare</i>
Sweet Marjoram	<i>Origanum sp</i>
Oregano	<i>Origanum sp</i>

Chives	<i>Allium schoenoprasum</i>
Garlic Chives	<i>Allium sp</i>
Thyme	<i>Thymus vulgaris</i>
English Thyme	<i>Thymus sp</i>
Peppermint	<i>Mentha sp</i>
Spear Mint	<i>Mentha sp</i>
Apple Mint	<i>Mentha sp</i>
Common Mint	<i>Mentha viridis</i>
Fennel	<i>Foeniculum vulgare</i>
Lemon Balm	
Coriander	<i>Coriandrum sativum</i>
Tarragon	<i>Artemisia dracunculus</i>
Celery	<i>Apium graveolens</i>

#### MEDICINAL PLANTS

Venwal	<i>Coscinum fenestratum</i>
Wana Raja	<i>Anoectchilus regalis</i>
Heen aratta	<i>Languas calcarata</i>
Heen Tambala	<i>Carmona microphylla</i>
Heen Gotukola	<i>Centella asiatica</i>
Eekaweriya	<i>Rauwolfia serpentina</i>
Eriweriya	<i>Plectranthus zeylamcus</i>
Bulu	<i>Terminalia belerica</i>
Nawahandi	<i>Citrus japonica</i>
Nelli	<i>Phyllanthus embelica</i>
Attikka	<i>Ficus racemosa</i>
Pawatta	<i>Pavatta indica</i>
KotadiMbula	<i>Ficus hispida</i>
Bin Kohomba	<i>Munronia pumila</i>
Karada	<i>Pongamia pinnata</i>
Komarika	<i>Aloe vera</i>
Hatawariya	<i>Asparagus falcatus</i>
Chamomile	

#### RAIN FOREST RESCUE PLANTS TRANSFERRED TO NSRC

##### *Native Orchids*

*Oberonia zeylanica*  
*Oberonia wightiana*  
*Oberonia thwaetsii*  
*Liparis atropurpurea*  
*Liparis viridisflora*  
*Dendrobium macrostachyum*  
*Bulbophyllum thwaetsii*  
*Bulbophyllum sp (1)*  
*Bulbophyllum sp (2)*  
*Bulbophyllum sp (3)*  
*Cymbidium bicolor*  
*Podocdyrus sp*  
*Adrorhizon purburascens*  
*Bamboo orchid – unidentified*  
*Cryprium panginifolia*  
**Collected from Nuwara Eliya**  
*Liparis walkeriae*  
*Dendrobium nutans*  
*Dendrobium heterocarpum*

84

**Orchids (continued)**

*Bulbophyllum wightii*

*Coelogyne odoratissima*

*Eria bicolor*

*Calanthe purpurea*

*Robiquetia brevifolia*

*Satyrium nepalense*

**Collected from Bandarawela**

*Dendrobium panduratum*

*Bulbophyllum macraei*

*Acanthephippium bicolor*

*Luisia teretifolia*

*Luisia tenuifolia*

**Collected from Kotmale**

*Malaxis versicolor*

*Coelogyne breviscapa*

*Eria tricolor*

*Eria lindleyi*

*Phaenus tancarvilleae*

*Cymbidium aloifolium*

*Cymbidium ensifolium*

**Collected from Bolouru Ella**

*Oberoma longibracteata*

**Collected from Sinharaja**

*Dendrobium diodon*

**Collected from Ambagamuwa**

*Pholidota pallida*

*Eulophia graminea*

**Collected from Mirahawatte**

*Arundina minor*

**Collected from Horana**

*Thrixspermum pulchellum*

*Thrixspermum pugionifolium*

**Collected from Rakwana**

*Vanda parviflora*

*Podochilus saxatilis*

**Collected from Mahyangana**

*Vanda tessellata*

**Collected from Hakgala**

*Robiquetia rosea*

**Dansinan**

*Podochilus malabaricus*

**Haputale**

*Anoectochilus setaceus*

*Papilionanthe subulata*

25

# Memo

**To :** Dr Bruce Beehler  
and  
Dr Ranil Senanayake

**From :** Leonardo V Chiu

**Date :** November 10, 1998

**Re :** **Forest Garden Total Ecosystem Management Approach Program  
Year 1 Annual Report Covering October 1997 To September 1998**

---

## 1 Introduction

This Year 1 Annual Report of the Philippine segment of Forest Garden Total Ecosystem Management Program covers the period October 1997 to September 1998

The presentation of this Report follows the activities scheduled in the Gantt chart of the official grant document (ref page 24/Table 1 B - Timeline Implementation Plan)

### Year 1 Bottomline of Forest Garden Program

In Year 1 operations of the Forest Garden Program, Counterpart International in the Philippines was able to

1 Involve four Cebu province communities, some 250 households or a total of 1,000 household members, 250 hectares of individual farm lots and about 1,100 hectares of communal reforestation farms in forest garden activities and analog forestry

2 Undertake field site profile studies, conduct five farm planning sessions, biodiversity resource mapping in all areas, one public forum on analog forestry and forest garden, two roundtable conferences with key leaders in the region, and one technical workshop on analog forestry and forest garden, host five technical and scientific visits, extend sustained technical assistance to participating Forest Garden field sites, and attend one international training

3 Link Forest Garden field sites with local government units, key government departments, and local and foreign resource agencies

4 Raise match funding in the amount of \$26,000 (documented) and \$10,000 (documentation in process)

5 Organize a SEC-registered and government accredited country office, write and adopt a country strategy, formulate and install standard operating procedures and control system, establish a performance evaluation process, created a SEC-registered and DTI-accredited marketing facility, and be invited as a member of the advisory council of the Regional Development Council in Region 7

**Forest Garden**  
**Total Ecosystem Management Program**

**1 Establishment of Country Office**

The country office of Counterpart International in the Philippine was registered by the Securities and Exchange Commission (S E C A-1998-942) on 11 February 1998 and by the Bureau of Internal Revenue (BIR tax identification number No 200-654-956-000) on 10 March 1998

The decision to locate the Philippine office of Counterpart International in Cebu City was arrived at due to the fact that (a) Forest Garden is most relevant in the areas south of Manila and (b) Cebu City is the center of political liaison and hub of trade, commerce and industry, and communications in southern Philippines

With the country staff in place and actively participating in the establishment of the office, the whole month of October 1997 was used to (a) acquire equipment and fixtures, (b) design organizational chart and write job descriptions (c) formulate a country strategy, (d) write and install the organization's operating systems and control procedures, (e) draft the personnel and travel policies, (f) prepare for SEC registration and BIR certification, (g) build reference materials, (h) design the performance evaluation system, (i) write the strategy paper of the Forest Garden Program and (j) network

Counterpart International/Philippines with the local government units, non-government organizations and people's organizations in Region 7

Counterpart International/Philippines holds office at 309 Junquera Street, Cebu City 6000, Philippines

## **2 Hiring of Office and Program Personnel**

Leonardo V Chiu, who has been engaged as consultant by Counterpart International prior to the undertaking of Forest Garden program and was in October 1998 designated country director in the Philippines, caused the hiring of the following national staff (a) Gina Hortelano [program development specialist, currently on leave], (b) Ireneo B Sita [program operations manager], (c) Esterlita F Llenos [accountant], (d) Rachel Torralba [administrative officer], (e) Raul Edwin Alemania [Forester] and (f) Millicent Olmedo [utility] In March 1998, (g) Marcial Geralde [Forester] was hired to complement the team

## **3 Selection of Field Sites and Partner Groups**

Selection process of field sites started with the building of directory of accredited non-government organizations and people's organization operating in the Philippines. A list of organizations assisted by the Department of Environment and Natural Resources (DENR) was also generated. Included in this list were national parks within the central Visayas region (Region 7), their ecological profiles and nongovernment and peoples organizations operating within the area

The following are the criteria used for the selection of forest garden sites (a) location of the program in communities where strong, experienced and organized people's initiative on environment protection, sustainable agriculture and alternative income-generating activities exist, (b) accessibility of these communities by public transport utilities, (c) presence of government basic services, (d) relating forest garden project with the Department of Environment and Natural Resources on the strategy of forest protection and with the Department of Agriculture on sustainable agriculture, (e) Forest Garden program perceived by the communities [i] as articulating environment protection, [ii] facilitating an economic option, [iii] recognizing and respecting prior rights, and [iv] advocating self-governance

Based on the preceding site selection criteria, the program staff identified and visited the following

- 1 The village organization of Tabunan, Cebu City  
United Farmers Multi-purpose Cooperative (UFMC)
- 2 The village organization of Tabla, Liloan, Province of Cebu

Tabla Multi-purpose Cooperative (TMPC)

- 3 The village organization of Catmondaan, Catmon, Province of Cebu  
Hiniusang Mag-uuma sa Catmondaan, Inc (HIMASACA)
- 4 The village organization of Tabayag, Argao, Province of Cebu  
Kapunungan sa mga Mag-uuma sa Kabalawan (KAMAKA)
- 5 The village organization of Cotcot, Liloan, Province of Cebu  
Solima Bantay Dagat Association, Inc
- 6 The village organization of Nug-as, Alcoy, Province of Cebu  
Kapunungan sa mga Mag-uuma sa Yutang Lasangnon sa Bololacao Agroforestry  
Development Multi-purpose Cooperative (KMYLB)
- 7 The village organization of Basak, Badian, Province of Cebu  
Badian Forest Development Foundation, Inc (BFDFI)
- 8 The village organization of Valencia, Alegria, Province of Cebu  
Valencia Farmers Association (VFA)
- 9 The village organization of Cabutungan, Santander, Province of Cebu  
Cabutungan Multi-purpose Cooperative (CAMCO)
- 10 The village organization of Ayungon, Province of Negros Or  
Ayungon Forest Management Organization, Inc (AFMOI)
- 11 The village organization of Lamigan, Ayungon, Province of Negros Or  
Asosasyon sa mga Mag-uuma sa Lamigan, Banban, and Nabhang, Inc
- 12 The village organization of Sandayaw, Guihulngan, Province of Negros Or  
Banikanhong Kapunungan Alang sa Kauswagan, Inc

Also visited by the program staff were the following national parks declared as protected by the Department of Environment and Natural Resources

1 Cebu Central National Park Located in the mountain barangays (villages) of Cebu City, Tabunan Forest is part this national park. The area is known to be the only habitat of the four-colored Cebu flower pecker

2 Sudlon National Park It is located at the southern boundary of Cebu City where the headwater of the critical Mananga watershed starts

3 Mananga Watershed Forest Reserve This national park covers some barangays (villages) in Cebu City to the southern adjunct municipality of Talisay

4 Kot-kot-Lusaran River Watershed Forest Reserve This natural park traverses the boundaries of Cebu City at its northern portion and the municipalities of Liloan, Compostela and the city of Danao

In Year 1 of the program (Oct 1997 to Sept 1998), Forest Garden is undertaken in four villages in four municipalities of Cebu Province

1) Nug-as, Alcoy, Province of Cebu – Implemented by the Kapunungan sa mga Mag-uuma sa Yutang Lasangnon sa Bololacao Agroforestry Development Multi-purpose Cooperative (KMYLB), the more than 100 farmer members of this participating cooperative have each an average land holdings of one hectare and are cultivating a communal farm of some 1,000 hectares of forest land. Second forest covering of at least 350 hectares is located within this forest land. Some 30 individual members have already been awarded certificates of steward contract (CSC) and the KMYLB itself has already been given community-based forest management agreement (CBFMA) by the Department of Environment and Natural Resources in the course of Forest Garden Program implementation

2) Tabla, Liloan, Province of Cebu - The program is undertaken by the Tabla Multi-purpose Cooperative Inc (TMPCI) and the village of Tabla lies within the boundary of the Cotcot-Lusaran Watershed. The cooperative has more than 300 members owning an average of one half hectare of land

3) Basak, Badian, Province of Cebu - Previously organized by the Central Visayas Resource Management Project (CVRP), the Badian Forest Development Foundation Inc (BFDFI) has 89 members tilling an average of one hectare of land. Remnants of Basak forest, located in the higher portion of the village and comprising some of 300 hectares, serve as the organization's communal agro-reforestation area

4) Catmondaan, Catmon, Province of Cebu - The participating village group, i.e. Hinusang Mag-uuma sa Catmondaan, Inc (HIMASACA), is composed of 45 mostly women farmers who are involved in soil and water conservation, reforestation and agro-forestry activities. It has also an estimated forest land of 230 hectares. Within this timber land area, members of the organization have availed of the CSC issued by the government.

Beginning the first quarter of Year 2 (October to December 1998), the Forest Garden Program will be expanded to two municipalities of Negros Oriental, with the participation of the village organizations (a) Ayungon Forest Management Organization Inc (AFMOI) and

- (b) Asosasyon sa mga Mag-uuma sa Lamigan, Bamban and Nabhang Inc in Ayungon and the
- (c) Banikanhong Kapunungan alang sa Kauswagan Inc in Guihulngan

#### **4 Development of Philippine Forest Garden Plan**

The development of the Philippine Forest Garden plan has its beginning in the strategic country paper and field sites selection criteria formulated by the staff of Counterpart International/Philippines early on. Please refer to items No 1 and 3 in pages 1 and 3 of this report.

However, the fleshing out of this plan, as may be extracted from the Project Goals and Objectives in page 29 to 31 of the official grant document, was done through the crafting of the following strategic framework: (a) technical assistance in analog forestry and institution-building, (b) financial and marketing assistance, (c) legal assistance on tenurial rights and (d) networking/linkaging for basic services.

It may also be relevant to this section of the report to review the standard operating procedures and control systems installed (ref. item No 1 pages 1 - 2) to support the delivery of the program.

#### **5 Forest Garden Training of Country Office Staff**

(a) Early into the program, the staff of Counterpart International/Philippines trained themselves in the implementation of Forest Garden. This they did by acquiring data on agro-reforestation and rainforestation undertaken by government and private agencies and comparing them with the Forest Garden processes available only in literature form at that point in time.

The coming in November 12 and 13, 1997 of Mr. David Vosseler, then vice president for programs of Counterpart International, and Dr. Bruce Beehler, then biodiversity specialist of Forest Garden, validated the process. They also checked on the integration of the systems and procedures locally formulated with the systems and procedures of Counterpart International HQ.

(b) Leonardo V. Chiu and Edwin Alemania left for Sri Lanka in mid November 1997 to participate in the two-week Forest Garden training conducted by Dr. Ranil Senanayake at the Neosynthesis Research Center in Mirahawitte, Bandarawela. Attended by some 30 participants, including Mr. Vosseler, Dr. Beehler and the late Nicholas Bowness, the training was a mix of theory, workshops, field visits to forest garden sites and hands-on observation at the research center.

(c) On 12 to 15 February 1997, Ms Helen Benz (chief administrative and finance officer of Counterpart International) visited Cebu province, particularly the Forest Garden site in Tabla, Liloan. The visit of Ms Benz was directed at re-validating the standard operating procedures and control systems formulated by the Philippine office and their final integration with the procedures and systems of Counterpart International HQ.

(d) Dr Ranil Senanayake, scientific director for Forest Garden Program, visited Cebu province on March 20 to 28, 1998 to train the country program staff in farm planning and resource mapping. This training was both actual field activities in Basak, Badian and Nug-as, Alcoy and classroom approach in the training center of Cebu Upland Project in Boljoon. The phase of the training in Boljoon was also participated by 30 farmer leaders coming from three forest garden sites.

(e) The country program staff was also trained by Dr Bruce Beehler on biodiversity monitoring protocol and evaluation design during his program visit to Cebu province on May 29 to June 4, 1998. To provide the training with appropriate environment, Dr Beehler and the program operations staff of Counterpart International in the Philippines visited the forest garden sites in Basak, Badian and Nug-as, Alcoy.

(f) Dr Kevin Vang, executive director of the Australian Foundation for Asia and the Pacific, a partner of Counterpart International, came to Cebu province and shared his knowledge on monitoring and process documentation with the country program staff of Counterpart International/Philippines. He also visited two forest garden sites and encouraged the country director to submit a proposal to his foundation in Australia for a possible \$10,000 funding assistance.

## **6 Forest Garden Workshops and Roundtable Conferences**

In his technical and scientific visit on 20 to 28 March 1998, Dr Ranil Senanayake conducted one two-day workshop, one top-level roundtable conference and one public forum on analog forestry.

Held in Boljoon, Cebu, on 26 to 27 March 1998, the two-day training workshop on analog forestry and forest garden design was participated in by 22 farmer leaders coming from Tabla Multi-purpose Cooperative Inc., Badian Forest Development Foundation Inc. and the Kapunongan sa mga Mag-uuma sa Yutang Lasangnon sa Bololacao. This workshop was also attended by the country office staff of Counterpart International/Philippines and the municipal agricultural officer of the municipality of Liloan, Cebu. The evaluation submitted by the participants showed that the conduct of the seminar was efficient, relevant, productive and applicable.

A roundtable conference was also conducted by Dr Senanayake on March 23, 1998. The conference drew the participation of top-level officers of the Department of Environment and Natural Resources in Region 7. In attendance were all the regional technical directors, the provincial environment and natural resource officers of three island provinces and the community environment and natural resource officers in the region. Discussions centered on biodiversity.

On 24 March 1998, Dr Senanayake was the principal resource person of a public forum organized by Counterpart International/Philippines. The subject of this public forum was *Improving Capabilities in Environment Management through Analog Forestry* and attended by 25 key personnel of non-government organizations, peoples organizations, the Department of Environment and Natural Resources, the Department of Agriculture, Church-mandated organization and the academe.

Dr Bruce Beehler concluded his May-June 1998 technical visit yet with another roundtable conference on biodiversity with his principal counterpart at the Department of Environment and Natural Resources, Dr Dioscoro Melana. Dr Melana, the government agency's regional technical director for environment and wildlife, categorically expressed his desire and the readiness of his office to work with Counterpart International in the Philippines. The country staff also attended this roundtable.

A cross visit to the rainforestation farm in the Visayas State College of Agriculture in Baybay, Leyte was undertaken in 17 to 19 June 1998 with the participation of 14 farmer leaders coming from the four forest garden sites. The purpose of the visit was to provide the participants with first hand information on the rainforestation program of the state college. Funded by the GTZ of Germany, the 5-year-old program shares similar environmental and economic features of Forest Garden.

Forest Garden partner Kahugpongan sa mga Mag-uuma sa Yutang Lasangnon sa Bololacao was also fully given technical assistance in the two days (August 6 to 7, 1998) that its general membership assembled for a strategic planning and reorganization. The results of this activity were the (a) updating of the organization's vision statement, (b) replanning its goals and objectives, (c) integrating the Forest Garden Program into the work activities for the next five years, and (e) election of new officers to carry out the programs of the community for the next five-year term. One hundred per cent (100%) of the members attended this exercise. Guest farmer-leaders from the neighboring villages of Nug-as came to observe the proceedings.

And, just as Year 1 of program implementation was coming to a close, 40 farmers in the Forest Garden site in Nug-as, Alcoy enlisted in a regular once-a-week tutorial on integrated pest management. The tutorial started last 8 September 1998 and it is going to cover the period of 15 weeks.

During the past Year 1 of Forest Garden Program implementation, a total of five biodiversity resource mapping and farm planning activities were conducted by the country program staff in all of four Forest Garden field sites, with some 168 farmer-leaders and members attending

## **7 Building of Relationships with Field Sites**

In building the relationship with Forest Garden field sites, the program staff is guided by three modes of action (a) integrating Forest Garden Program in the larger goals and objectives of partner organizations, (b) sustained presence of the program staff in the community and immersing themselves into the local culture of the people, and (c) assisting partner organizations identify external resources for their basic needs not deliverable by the program

In the villages of Nug-as (Alcoy) and Catmondaan (Catmon), the relationship between Counterpart International/Philippines and partner organizations has been further defined into specific roles and responsibilities by way of a memorandum of agreement (MOA)

## **8 Resource Surveys**

During the year, land classification profiling, rapid socio-economic and demographic surveys and inventory of biodiversity were conducted in all Forest Garden Program sites. However, it should be noted that, due to limited logistics and funding support, these studies were brief, tentative and subject to a more exhaustive undertaking,

a **Land Surveys** All four field sites of Forest Garden Program are located in a mix of mostly calcareous, Faraon clay and Lugo clay timberland and alienable/disposable lands. While members of participating organizations claim to possess an average of one hectare each, much of the land in field sites is claimed by absentee claimants. The program's initial estimates, based on various and at times overlapping claims, tenancy is somewhat verifiable to be not less than 60 per cent. Erosion follows the Cebu provincial average of 6 tons per hectare per year. Information of total land area of participating villages, geologic structures, topography, land use and vegetative cover, mineral resources and reserves, seismicity, groundwater information, watershed systems and general climate type was also obtained

b **Community Surveys** Forest Garden field sites share the following generalization (i) farming as primary source of income, (ii) complementing farming with secondary sources e.g. fishing and doing odd jobs in nearby areas, (iii) average of six in the family, (iv) extended household, (v) functionally literate, (vi) community as having

slightly more male population, (vii) age ranging 14 to 25 are in employment centers e.g. Cebu City and Danao City, (viii) predominantly Roman Catholic, (ix) reliance on inorganic pesticides and fertilizers, and (x) preventable diseases causing most deaths

c **Biodiversity Resource Mapping** A resource inventory was done in all four Forest Garden field sites

Inventory listings of flora and fauna found in participating villages are classified as thus (i) timber trees, (ii) fruit trees, (iii) shrubs and herbs, (iv) vines, (v) epiphytes and lichens, (vi) birds, (vii) mammals, (viii) amphibians, (ix) reptiles, (x) fish and other living things in fresh water, and (xi) insects and pests. The inventory also includes their economic and biological value and the degree of their existence in the community. This information is in local (Cebuano/Visayan) dialect.

Mapping and validation of survey maps were also done in all four sites. This activity includes actual site surveys of their proposed forest garden farms, remaining forest and timber land area, and plantation, other resources in the community such as springs, streams, rivers and the types of plants (timber trees and fruit trees) endemic and indigenous to the community. Also in this survey is the listing of actual agricultural practices, types of commercial and synthetic fertilizers and chemical used, size of their individual farms, and animals and livestock.

## 9 Monitoring

One important note of the monitoring system so far employed by the Forest Garden Program operations staff is that operations manager Rene Sita spends at least 60 per cent of his time per month in the field sites, forester Edwin Alemania, 70 per cent, and forester Marcial Geralde, 80 per cent. Country director Leonardo V. Chiu visits at least 3 field sites per month. Accountant Ester F. Llenos and administrative officer Rachel G. Torralba visit these sites on a per-need basis.

a **Garden Development** The development of individual farms of each member of partner organizations included detailed activities and work assignment of forest gardeners and members of their families. Soil and water conservation plan was also rendered specific in the development of forest garden plans. Shift from the use of commercial chemicals and pesticides is also included. The establishment of home nurseries and compost pit and the sourcing of planting materials were tacticized.

b **Biodiversity** A baseline of the biodiversity of the Forest Garden Program field sites have already been conducted (ref. item No. 8, sub-heading c, page 9 of this report). Monitoring is going to be made on the basis of a method now currently being drafted and evaluated.

The program staff of Counterpart International/Philippines undertakes the monitoring activities of Forest Garden Program based on (a) their individual time organizer and (b) the participating communities' work schedules. Staff meetings and tactic sessions are done weekly on Tuesdays to assess the flow of Forest Garden Program.

## 10 Technical Assistance to Forest Garden Farmers

Technical assistance was provided to both individual farmer-members and groups in all of the four Forest Garden sites.

1 Farm and house visits were provided to all members of the participating village organizations. These visits were aimed at providing technical assistance to farming and forestry activities of the members. This assistance included the development of farm plans, actual farm lay-outing for hedgerows and rock walls, composting, fruit and timber stand improvement, plantation design, selection and procurement of planting materials and nurserying. These visits were also timed to gather information on their livestock and verify current agricultural practices.

2 Assistance was also provided to Kapunongan sa mga Mag-uuma sa Yutang Lasangnon sa Bololacao (in Nug-as, Alcoy) and the Badian Forest Development Foundation Inc. in the technical requirement of their reforestation contracts with the Department of Environment and Natural Resources. In Nug-as, Alcoy, the participating organization is reforesting 357 hectares of timber, 95 hectares for agro-forestry and 30 hectares for rattan plantation. In Basak, Badian, Counterpart International/Philippines' partner organization is reforesting 30 hectares for rattan plantation, 25 hectares of endemic and 15 hectares of dipterocarp.

3 A 5-hectare analog forestry farm and forest garden was also established in Nug-as, Alcoy to showcase the technology of the program. This farm was designed to compose a forest garden nursery and green house, arboretum, orchidarium, livestock shed, a bio-gas tank and a rainwater catchment tank. It was also designed to host the production of planting materials and mother plants, timber trees, fruit trees and ornamental plants. Current production of indigenous seedling is estimated at 10,000 seedlings, 25,000 exotic species, 5,000 fruit trees. The farm was also provided with complete manual farm implements.

4 Technical assistance provided during Year 1 to partner organizations in Forest Garden sites included institution-building such as leadership skills, strategic planning, monitoring and evaluation. The annual planning and evaluation activities of the partner village organization in Nug-as, Alcoy resulted in a redefined vision, missions and plan of actions for the August 1998 to July 1999. Leadership, human resource development

seminars and financial management are also being planned for the sites in Nug-as (Alcoy), Catmondaan (Catmon), Tabla (Liloan), and Basak (Badian) in Year 2 onward

5 An orientation on land titling and tenurial rights were also undertaken in the village of Tabla, Liloan Attended by 14 farmer-members of Tabla Multi-purpose Cooperative Inc , the law firm of MR Lepiten and Associates discussed the legal requirements in land titling, various types of tenurial instruments issued by the Philippine government and the process involved in acquiring land titles Issues and problems associated with the titling of lands located within the watershed areas were emphasized

6 Counterpart International/Philippines failed in the test case of increasing the productivity of Tabla, Liloan farmers engaged in barbecue stick production The manually-operated machine designed by a fabrication firm on orders of Counterpart International/Philippines did not work to achieve the goals of (a) reduction of labor, (b) increased productivity and (c) reduction of wastage

### **11 Building Linkages with External Institutions**

In obtaining support for the implementation of Forest Garden Program in participating communities, Counterpart International/Philippines has forged linkages with government and private agencies Year 1 of program operation saw these linkages instrumental in providing forest gardeners additional resources

1 The Department of Agriculture is currently conducting onsite training on integrated pest management for vegetable production Benefiting at least 40 Nug-as, Alcoy farmers, this training will be completed in November 1998 Expertise in the area of organic farming was also provided by this department through the municipal agricultural officers of the municipalities of Liloan and Alcoy Corn and jack fruit planting materials came from this department

2 The Department of Environment and Natural Resources made available to Counterpart International/Philippines maps of forest garden field sites, ecological profiles of the areas and their resource inventories It has also accredited Counterpart International/Philippines to allow it to participate in its work contracts In a meeting with the agency's regional executive director, the department's facilities and resources were offered for use by Counterpart International/Philippines

3 The Philippine Coconut Authority delivered 500 nutlings for planting in Nug-as, Alcoy and extended technical assistance to the farmer-members of participating organization on the proper planting and of coconuts

97

4 Counterpart International/Philippines has strong ties with the Phil-German Cebu Upland Project. Although the GTZ-funded project terminated last July 1998 after some 12 years of German funding, the Forest Garden Program was able to source from it 20 kilos of nitrogen-fixing planting materials, acquire technical papers and borrow audio-visual equipment and vehicles.

5 The University of San Carlos–Water Resources Center, through Peace Corps Volunteer Evan Pfaff, assisted in the survey on water exploration and use in Nug-as, Alcoy. It likewise extended training on water management and assistance in the preparation of technical study for the rehabilitation of the community's water system.

6 Initial discussion and meeting with CARE Philippines on the possibility of having its program in sustainable agriculture complemented by the technologies of analog forestry and forest garden.

7 Initial discussion with the Moalboal Orchid Gallery in Moalboal, in the eastern side of Cebu province for the possibility of forging partnership with Nug-as, Alcoy farmers. The orchid gallery sees itself able to provide training on orchid production and marketing.

8 Mag-uugmad Foundation Inc. and Counterpart International/Philippines has already agreed to a partnership in organic agriculture. For many years a recipient of Ford Foundation grants, Mag-uugmad Foundation Inc. will undertake the training of forest gardeners in organic agriculture in Year 2 of the Forest Garden Program. In return, Counterpart International in the Philippines will source funding to translate 10 How To Sustainable Agriculture publications of Mag-uugmad Foundation Inc. into video dramatizations.

## 12 Marketing FG Products

Year 1 of the Philippine segment of Forest Garden Program set the preparatory stage for the production of forest garden products and their marketing in the later part of Year 2. Specifically on the aspect of marketing, Year 1 of the program saw the incorporation of the Philippine Forest Garden Products Corporation with the Securities and Exchange Commission and its registration with the Department of Trade and Industry.

A feasibility study undertaken by the corporation on the marketing of forest garden products is on the final stages of writing. Early on, the members of the Board of Directors underwent a series of leadership training and a full session on strategic planning. The country staff of Counterpart International/Philippines also assisted the members of the board conduct a focus group discussion with the farmers/forest gardeners of Nug-as, Alcoy and gather collateral market information in the village market.

### 13 Match Fund Raising

The match funding of Counterpart International/Philippines' component of Forest Garden Program is designed in such a way matching is generated (a) at the field site level where partners are to contribute counterpart in the form labor inputs [sweat equity], use of land, planting materials and seedlings, and equipment, (b) at the organization/office level where counterpart is to be raised by mobilizing external fund and in-kind resources, and (c) at linkage level where technical expertise, materials and equipment, and basic services are to be tapped and brought into the project

Year 1 operations of Forest Garden Program brought in a documented matching in the amount of \$26,000 This figure was an aggregate of labor and service of members and officers during nursery activities, planting, sourcing of planting materials, and labor input in the development of their forest garden Included in this figure were rental of equipment and , monetized use of office space, facilities and farm tools

Linkage with other institutions, both government and private, was able to monetize contributions estimated to total to some \$10,000 (as this is still being documented as of the writing of this annual report) These contributions were in the form of rendered expertise, delivered planting materials, books and reading materials, equipment rental, and value of basic services

### 14 Issues and Problems

The following issues and problems were encountered during project implementation

1 The participation of the members of Forest Garden partner Tabla Multi-purpose Cooperative in Tabla, Liloan was perceived to be decreasing One immediate cause of this problem might be the lack of coordinating skills within the leadership of the village organization

In Tabla exists a number of intermediate institutions and agencies which vie for the time of the organization which is administered largely by women volunteers who have domestic chores to attend to The men in the village, one caught in the middle of a vanishing agricultural character and emerging urban values, are forced to leave their marginal lands for various odd jobs in the nearby cities of Cebu, Mandaue, Mactan and Danao As a consequence, agricultural production is presently limited to the traditional mango production and cattle fattening While this situation offers good opportunity for forest garden and analog forestry, the participation of the members and leaders of the village organization is critical to the success of the Forest Garden Program in the area

To respond to this situation in Tabla (Liloan), the plan to establish a nursery cum demonstration farm in the area was relocated in Nug-as and Basak These two areas offer more viable conditions for the success of forest garden project In Tabla, Liloan, a core group

of 10 farmers who have exhibited clear interest in forest garden activities is maintained. Each of these participating farmers is expected to maintain a backyard nursery to support the development of their forest garden.

2. There were matters consequential to the El Niño phenomenon which brought about water problems especially in the Forest Garden site in Nug-as, Alcoy. Counterpart International/Philippines attempted to respond to this situation by providing the Kahugpong sa mga Mag-uuma sa Yutang Lasangnon sa Bololacao with galvanized containers for rain water. It also sought the assistance of the University of San Carlos - Water Resource Center, with the cooperation of a Peace Corps Volunteer, to explore the possibility of rehabilitating and developing the existing water catchment system in the area.

3. The need to hire the services of an agriculturist who can assist partner organizations in crop production activities surfaced as a concern beginning Year 2 and which must be satisfactorily addressed by then.

4. Forest Garden activities planned in Catmondaan, Catmon were delayed for two months (July and August). The failure to undertake these activities was due to the delay on the part of the partner Catmondaan farmers' association to formally invite Counterpart International/Philippines. The group also wanted to forge a formal agreement with Counterpart International/Philippines prior to the implementation of Forest Garden Program in the area. Signing of the memorandum of agreement between the village partner Hinusang Mag-uuma sa Catmondaan Inc and Counterpart International/Philippines was done only in 12 September 1998.

5. After 10 long months of El Niño drought, most of the farmers in Forest Garden site in Basak, Badian spent most of their time planting corn to replenish their empty bushel. There were only five farmers who were able to establish hedgerows and rock walls. Others focused on their corn field. However, farm lay-outing and sticking activities, in preparation for the land's use as forest garden, continued and done as participating farmers tended their food crops. Soil and water conservation measures, such as the planting of hedgerows and installing rocks, are to be done after harvest in September.

### The Program

*Forest Garden Total Ecosystem Management for the Philippines* Started in the Philippines only in November 1997, the *Forest Garden Program Total Ecosystem Management Approach* aims at integrating the economic enterprise of the villages with reforestation and bio-diversity restoration, enabling them to manage their food requirements, fostering local and international markets for certified organic products, and promoting participation in local governance.

150

The processes of *Forest Garden Program* evolved from the principles of analog forestry as field-tested for 15 years in Sri Lanka. Analog forestry is a system of silviculture that seeks to establish a tree-dominated ecosystem analogous in structure and function to the original climax or sub-climax vegetation community. Forest Garden, therefore, is growing crop plants in a manner that they form a physical structure analogous to the original forest and providing microhabitat to many species that cannot exist without such environment.

The cluster of island provinces comprising central Visayas in Region 7 serves as the *Forest Garden Program* sites for the next five years. In these provinces, the incidence of poverty is close to 50 per cent, barely six to nine per cent of their original forest covers remain, erosion of mountain top soil, silting river beds and coastal areas, is at six tons per hectare per year, and industrialization is taking place at a dangerous speed and with very little regard for what land can absorb and do.

In its conduct of *Forest Garden Program*, Counterpart International in the Philippines supports its effort in the villages with programs on (a) **Institution-Building**, (b) **Marketing**, (c) **Legal Assistance**, (d) **Basic Services** and (e) **Skills Training**, these support programs are adopted on the assumption that the implementation of *Forest Garden Program* cannot be separated from the social, economic, cultural and political conditions permeating the villages.

oOo

Year 1 Annual Report  
on Memo Form 445 cdx  
LVC hd

**Forest Garden Program through Total Ecosystem Management  
ANNUAL REPORT—REGIONAL OFFICE**

Dr Ranil Senanayke  
Regional and Scientific Director  
Forest Garden Program  
Email 100232 3435@compuserve.com

The Regional Office was situated in Sri Lanka to facilitate the design of research and develop the certification program in order to facilitate the marketing of Forest Garden Products. The work of the regional scientific Director covered the Sri Lanka and Philippine components, although productive linkages to the TEM program were encouraged.

The regional office of Counterpart in Sri Lanka, supported the development of the country programs in Sri Lanka and the Philippines by providing the technical input for project design and evaluation. It has also acted as a crucial link in developing the Latin American reach of the TEM program by building capacity and interest in COBIOTECH from Chetumal, Mexico and by introducing the TEM concept to Rainforest Rescue in Ecuador. While a very active year was experienced this report will be presented as responses to the goals set out in the job description, in a chronological fashion. It is hoped that this form of reportage will allow for greater clarity.

The development of definitions of the Total Ecosystems Management concept was underway with discussions on the subject with David Voeseller and Nick Bowness from October 1998 to January 1998. During this period an outline was developed through a large amount of consulting with regional NGOs. The concept was discussed during all of the local meetings held in Sri Lanka. The outcome of these consultations were developed for the web page that was being worked on by Nick Bowness and myself. This identified TEM as

A resource use methodology, that is developed with specific reference to the ecosystem that is being managed. Where it exists, traditional management knowledge that is of antiquity provides the basis for the development paradigm. In other instances the scientific knowledge of that ecosystem and its links will provide the design parameters. The TEM approach seeks to achieve sustainable development based on the maintenance of local biodiversity, cultural diversity and environmental health. A critical element of the TEM approach is to ensure the maximum independence with an appreciation of the interdependence of local communities.

In the implementation of the Counterpart TEM programme five critical tools have been identified.

- 1 Ecological Landscape Planning
- 2 Analog Forestry
- 3 Public education
- 4 Certification
- 5 Marketing

TEM will complement land-use planning at the catchment or watershed scale, wherein rural communities rationally plan the management and husbandry of their land, soil, forest, and water in a manner that recognizes the importance of renewable ecosystem services, waste recycling, and environmentally sustainable use of resources. Total Ecosystem Management is, in reality, nothing more than the principles of "wise use" of one's local environment, but its focus on linkages and the services provided by natural resources can provide significant changes in local behavior when adopted by a community. The successful application of the Forest Garden Initiative is dependent on the understanding and acceptance of Total Ecosystem Management as an overarching planning concept.

At present I am working on a booklet that describes the operation of the five tools used in the implementation of TEM. It is hoped to have the publication completed by 1999.

The regional office also provided support to the local implementing NGO's in designing and evaluating project implementation strategies.

In November 1997 a two-week Forest Garden training was conducted by Dr. Ranil Senanayake at the Neosynthesis Research Center in Mirahawitte, Bandarawela. Attended by some 30 participants, including Mr. Vosseler, Dr. Beehler and the late Nicholas Bowness, the training was a mix of theory, workshops, field visits to forest garden sites and hands-on observation at the research center.

December The following organizations were contacted. Three meetings were held with Lanka Organics: Mr. S. Muthuswamy, Lanka Organics and Mr. T. L. Raj, Lanka Organics regarding the marketing of Forest Garden Products. Another meeting was held with The Export Development Board of the Government of Sri Lanka, L. Wijedasa on the protection of the certification system.

In January 1998 meetings were held with Mr. Navin Gooneratne of the Southern Development Authority of Sri Lanka on the Kammeliya-Sinharajah corridor and the ELEPHAS project that Counterpart has agreed to work on with the Sri Lanka Government.

In February two meetings were held with the Conservator of Forests and with the Ministry of Forestry on the Kanneliya Corridor. Local meetings were held with the Galle Organic Farming and Conservation group and the Nature Conservation Group on TEM program and its applicability to their local concerns. —

March was very active in terms of developing the Forest Garden Product (FGP) certification programme. The programme is essential to the success for the Sri Lanka and Philippines projects. A meeting was held in Quito, Ecuador on the standards and procedures. Meetings were held with Ms. L. Gamboa, Director of Rainforest Rescue who had been developing the

Latin American aspect

In May an international meeting of the International Analog Forestry Network (IAFN) was held in Madre de Dios, Peru. Delegates from six countries attended. As this was the meeting where the Procedures and Standards were being agreed upon, I attended to represent counterpart. The meeting was very successful and an internationally agreed upon draft was issued.

June saw the further development of the FGP certification work with the issue of the second draft of the Standards and Procedures Manual. The Draft was discussed with the Export Development Board of the Sri Lanka Govt. Meetings were also held with Guyapi Tropicals of France who will introduce the FGP certification to the EU meetings on certification.

July The Logo for FGP certification was completed and submitted to the IAFN for approval. Meetings to determine the best strategy to incorporate FGP certification into the export market were held with M/S Lanka Organics, M/S Hansa Coffee and with M/S Stassens in Sri Lanka.

August Attended a series of workshops in developing certified natural products in Chennai and Bangalore in India. There was much interest from three local NGOs on the concept of AF and FGP's. A regional workshop is being planned to sensitize Indian NGOs to the concepts of AF and FGPs.

The last year was very intense in terms of providing support to local implementing NGO's. In Sri Lanka monthly meetings were held with the individual section leaders as well as a group meeting once a month. The meeting schedule was as follows:

#### Philippines

In the Philippines five meetings with local implementing partners and two meetings with the Counterpart (Philippines) were held. This included an intensive course in Analog Forestry and Landscape Management. Dr. Ranil Senanayake, scientific director for Forest Garden Program, visited Cebu province on March 20 to 28, 1998 to train the country program staff in farm planning and resource mapping. This training was both actual field activities in Basak, Badian and Nug-as, Alcoy and classroom approach in the training center of Cebu Upland Project in Boljoon. The phase of the training in Boljoon was also participated by 30 farmer leaders coming from three forest garden sites.

In his technical and scientific visit on 20 to 28 March 1998, Dr. Ranil Senanayake conducted one two-day workshop, one top-level roundtable conference and one public forum on analog forestry.

In Boljoon, Cebu, on 26 to 27 March 1998, the two-day training workshop on analog forestry and forest garden design was participated in by 22 farmer leaders coming

from Tabla Multi-purpose Cooperative Inc , Badian Forest Development Foundation Inc and the Kapunongan sa mga Mag-uuma sa Yutang Lasangnon sa Bololacao This workshop was also attended by the country office staff of Counterpart International/ Philippines and the municipal agricultural officer of the municipality of Liloan, Cebu The evaluation submitted by the participants showed that the conduct of the seminar was efficient, relevant, productive and applicable

A roundtable conference was also conducted by Dr Senanayake on March 23, 1998 The conference drew the participation of top-level officers of the Department of Environment and Natural Resources in Region 7 In attendance were all the regional technical directors, the provincial environment and natural resource officers of three island provinces and the community environment and natural resource officers in the region Discussions centered on biodiversity

On 24 March 1998, Dr Senanayake was the principal resource person of a public forum organized by Counterpart International/Philippines The subject of this public forum was Improving Capabilities in Environment Management through Analog Forestry and attended by 25 key personnel of non-government organizations, peoples organizations, the Department of Environment and Natural Resources, the Department of Agriculture, Church-mandated organization and the academe

#### Sri Lanka

During the year twenty meetings were held with the section leaders at their projects Nine team meetings with the entire senior staff of the NSRC Forest Garden programme were held during the year

Worked on a 'Standards and Procedures Manual for the International Analog Forestry Network (IAFN) This work took about three months to complete and a draft was presented to the IAFN in Peru in July 1998 The comments of the international delegates were noted and the negotiated document is being prepared for submission the network by October 1998

Worked with Mr L Goldberg of the NSRC FGP certification office on streamlining the certification process for Sri Lanka

Developed a series of 'Indicator Species' for certification evaluation

Developing market opportunities for certified 'Forest Garden Products'

Eight meetings were held with M/S Lanka Organics Ltd on export of certified FGP's An agreement to promote FGPs in their marketing program was obtained

In June 1998 a meeting was held with the Export Development Board of Sri Lanka who are now interested in providing official recognition to the certification process

#### International

Two meetings were held with Rainforest Rescue of Ecuador in June and in September as this NGO was developing the FGP program for Latin America This included an intensive course in Analog Forestry and Landscape Management

One meeting with COBIOTECH in Chetumal , Mexico and three meetings with their local NGO partners were held This included an intensive course in Analog Forestry and Landscape Management

A meeting was held in Madre de Dios in Peru in June with seven international and fifteen local NGOs on Analog Forestry design and certification procedure

Work on supporting the development of a certification system for Forest Garden Products interested in providing official recognition to the certification process

#### Develop an office for Counterpart in Sri Lanka

The Counterpart Office development has been steady but slow due to the fact that no budget exists to develop such an office in a nationally effective manner The Office in Nuwara Eliya has been functioning for ten months ~~(???)~~

In addition to the above, the Regional Office has been working with Mr John Jack of Monash University, Melbourne, Australia to develop a data management system for the application of Analog Forestry by all the NGO's working on the concept A series of meetings were held with Mr Jack at Counterparts office in Sri Lanka in June 1998

**Appendix to USAID Annual Report for 1997-1998**

**COUNTERPART INTERNATIONAL**

**Total Ecosystem Management**

**Seminar/Workshop on Forest Garden and Analog Forestry**

**Neosynthesis Research Center**

**Belipola Estate, Bandarawela, Sri Lanka**

**November 17 to November 26, 1997**

**November 18, 1997/Tuesday**

The seminar/workshop on Forest Gardens and Analog Forestry opened at exactly 1 00 P M

David Vosseler, Vice President of Programs and Director of Counterpart International's Environment and Natural Resource Division, introduced himself to workshop participants, briefed attendees on the Forest Garden Program and gave an overview of Counterpart International

He informed all present that the Neosynthesis Research Center is the partner of Counterpart International in implementing the Forest Garden Program in Sri Lanka In the Philippines, David said, Counterpart International is establishing an office whose initial task will be to coordinate the implementation of the Forest Garden Program in the country

On behalf of Neosynthesis Research Center, Executive Director Kamal Malvani welcomed all the participants The Neosynthesis Research Center, one of the oldest non-governmental organizations in Sri Lanka, has over the last 15 years worked in sustainable agriculture and forest management in an attempt to identify and bolster "best practices" Kamy expressed her hope that her organization's partnership with Counterpart International on the Forest Garden Program will expand its effort in bringing about a better quality of life for the Sri Lankan people

The seminar/workshop activities and framework, which were designed to be participatory, case-oriented and flexible, were explained by Dr Ranil Senanayake Ranil, who serves as the Scientific and Regional Director of the Forest Garden Program, outlined the principles of a Total Ecosystem Management approach to integrated development and conservation Ranil is also one of the founding members of the Neosynthesis Research Center

After 18 years of refining Forest Garden methodologies, Ranil stated that "it can now be concluded that growing forests is allowing people to grow" Through the proven technologies of Analog Forestry and the establishment of Forest Gardens, "people can heal the land an important process in healing ourselves The seed planted many years ago is now a tree that gives shelter and fruits"

David then asked other Counterpart International people and the delegation from Counterpart International/Philippines to introduce themselves

Bruce Beehler, Biodiversity Specialist of Counterpart International and HQ anchor of the Forest Garden Program, reminisced on his boyhood affair with birds, a passion which would later lead him to academic institutions, national museums and international bodies

Nick Bowness, Creative Director of Counterpart International, mentioned his association with David, their days in Papua New Guinea and how David's work impressed him so much that it took him away from CD design and film production

Prior to his joining Counterpart International in February 1997 as its representative in the Philippines, Leonardo V Chiu was for an uninterrupted 23 years Director of Program Development, Evaluation and Operations of the second largest foundation in his country

Raul Edwin Alemania, now forester of Counterpart International in the Philippines, previously worked on the World Bank-funded Central Visayas Regional Project and GTZ-funded Cebu Upland Project to which he devoted 12 years of his professional life

Kamy also asked the staff and volunteers of Neosynthesis Research Center and the officers of allied non-government organizations participating in the seminar/workshop to introduce themselves

They were Ajith N Lokuge, Ms Deepani Jayantha, Mendis Wickramasinghe, Ms Dayani Ratnayake, Anuradhe Rajindre, Indike Samaraweera, Roshan Kumara, Rohana Jayasekare, Noyel Withanage, Ajanthe Palihawadane, Rohan Pieris, Willy Gamage, Ms Nilmini Widyawardana, Priyanthe Fonseka, Priyanthe Palihakoon, Lawrence Goldberg and Athula Priyanthe Kamy has been with the Neosynthesis Research Center since its founding some 18 years ago

In introducing Total Ecosystem Management Ranil said he was still a small boy catching snakes and frogs when he first wondered why they were disappearing He was in his adult years, he said, when he learned that it was due to habitat loss

"The knowledge of land, not a Ph D degree, is what offers more learning," Ranil said He then asked everyone present to participate in exploring and understanding Total Ecosystem Management This is important, he said, because "one must have ownership of what he or she needs to do using the Total Ecosystem Management approach "

Everyone in the seminar/workshop contributed to defining the goals of Total Ecosystem Management as it concerns the Forest Garden Program After a lengthy discussion, the goals of Total Ecosystem Management in the Forest Garden Program were thus defined (a) sustainability, (b) conservation and building of biodiversity, (c) community development, (d) community participation, (e) watershed management, (f) income generation, (g) market development, (h) empowerment of people, (i) habitat restoration, (j) new institutional mechanism, (k) social and economic justice, (l) spiritual development and (m) stewardship of natural resources

In a further discussion, the group expressed the hope to achieve these goals through (a) landscape management and planning, (b) the application of analog forestry, (c) biodiversity restoration, (d) habitat and forestry restoration, (e) community mobilization, (f) eco-forestry, and (g) economic enterprise

What is the scale of an ecosystem? "For the whale, the sea is the ecosystem For human communities," Ranil said, "the ecosystem may be best viewed in the scale of a landscape In

which case, it now falls upon the responsibility of human communities to manage the scale in which they inhabit ”

The landscape of watersheds and water catchments, for example, is important to human communities. Ranil further explained that landscape can either be abiotic or biotic. No living things exist in abiotic landscapes. Within the biotic landscape, such as open lands or forests, living things find habitat.

The workshop participants took a lunch break at 2:00 P.M. Roundtable discussion continued when session resumed 45 minutes later. As the session resumed, Ranil discussed the subject of analog forestry.

Analog forestry is an approach. It is basically a silviculture technology that produces a tree-dominated system similar to a forest's original architectural structure. Ranil then drew a three-level canopy system to illustrate the point.

“Trees have their own architectural structures,” said Ranil, “as may be seen in the shape of their trunks and branches. One must bear in mind, however, that 99 per cent of the biodiversity of the forest resides in non-tree elements of the landscape. If one thinks only of trees, he or she misses the forest.”

Analog forestry is an integrated design that approximates the functions of the real forest. It has two important factors: (1) the utilitarian factor of hosting products that can be extracted from it by the communities for its social and economic uses, and (2) the stability of watershed and water catchment in terms of (i) biodiversity, (ii) biomass quality, (iii) water quality, (iv) soil development, (v) carbon sequestering potential, (vi) detoxification potential and (vii) net oxygen generation. One of the ways to assess the application of analog forestry to a given landscape is to use Kuchler's Formula.

Like trees, soil can be grown. This fact is very important to forest conservation efforts. The more the soil of the forest is left undisturbed, the more the forest is recreated. In the process, the more biodiversity is restored.

In the restoration of biodiversity, there are two important systems that need to be closely observed. Natural systems serve as habitat for endemic fauna and flora. The anthropogenic system centers on the adoption and use of exotic elements. In the context of analog forestry, these two systems can be rationalized and mixed to create a design.

Most of the participants brought up the matter of community mobilization as a method of integrating the villages into analog forestry endeavors. A few argued that the method has certain negative implications and wanted it resolved.

In the end, the term “community mobilization” was accepted by the participants as a way of involving the community in the establishment of forest gardens. In other words, there is no way for the Forest Garden Program to achieve its objectives unless we tap the energies of people ultimately to benefit from the program.

“Is analog forestry like eco-forestry as practiced in Papua New Guinea or agro-forestry in the Philippines?”

David offered to answer the question, as follows Eco-forestry is a low-impact and ecologically sustainable selective harvest of original forest through small scale operations carried out by resident entrepreneurs Agro-forestry is the combination of tree and non-tree agricultural crops for the purpose of providing a range of products for local commerce and subsistence

The matter of agro-forestry, as explained, went unchallenged But most of the participants showed resistance to the concept of eco-forestry, which allows the harvest of original forest

### **November 19, 1997/Wednesday**

At 6 00 A M , Ranil, Bruce, Kamy, Ronan, Ajantha, Leonardo and Edwin went to see a patch of original forest in Tangamale, where the Sri Lankan Benedictine Monastery is also located Virtually all the upland forest is restricted to small patches, and Forest Gardens can be a key buffer activity to protect and extend the forest patches

The objective of forest activities in Tangamale was to compare the biodiversity of a real forest to that of a tree plantation The conclusion of the group is that no tree plantation can replace the role of a real forest in sustaining biodiversity The group was back at the Neosynthesis Research Center at 10 30 A M

At 11 00 A M , team leaders of the Neosynthesis Research Center, where the seminar/workshop was held, presented their Forest Garden Program workplan to the officers of Counterpart International

Ajith was first to present Ajith will implement the Forest Garden Program in the Intermediate Zone as a major component of the larger Sri Lanka program In this zone, the specific project site consists of the five villages of Nikapothe, Metihakkka, Kaalakanniya, Kakkutu Arawa and Akkara Siyaya Sri Lanka has three zones, i e (a) the Dry Zone, (b) the Wet Zone and (c) the Intermediate Zone

Ajith circulated a paper for his presentation that contained maps of the Intermediate Zone and sketches of the area's (a) forest architecture, (b) ecological data and (c) sociological data In the course of his presentation, questions were asked How is a forest garden started? What is the certification process? Who buys what? Is there a contract that binds all parties involved in the forest garden?

After identifying a participating community, forest gardens are started by inventorying the biodiversity of the area The presenter referred to Lawrence Goldberg, who will answer all questions that pertained to the certification process and the marketing of certified forest garden products Ajith concluded his presentation by emphasizing the social processes that need to be observed in the conduct of the forest garden program

Ajantha was next to present He introduced his presentation with a brief discussion of his experiences in analog forestry field trials in Nuwara Eliya where erosion control, soil upgrading, demonstration trials and pilot farms were undertaken A paper detailing these experiences was later circulated

Mentioned by Ajantha is the district of Walepane in Nuwara Eliya, a main project site He showed a 1992 satellite picture of Walepane that showed evidence of ongoing loss of forest

cover in the Nuwara Eliya area Horton Plains will also be a Forest Garden Program site where some 60 forest gardeners are farming organic syrups

Sri Lanka, according to Ajantha, has a system of traditional temple forestry which dates back some 2000 years. In the temples, one can plant trees (a) anywhere in the temple grounds provided the temple remains in the center to symbolize the sun, (b) according to the formation of the planets, and (c) in the pattern of one's zodiac sign (as recommended by the priests)

Willie Gamage followed. Introducing himself as one with more than 20 years experience in community mobilization and grassroots institutional strengthening, Willie said he has decided to locate his part of the Forest Garden Program in Neluwa and Kahawatta (Pelmadulla) for the following reasons: (a) the current activities of many villages surrounding the Sinharaja pose a threat to the forest yet may be an asset to its sustainability and (b) the government has no conservation policy for small forest patches

The analysis offered by Willie in determining biodiversity disturbance focused on the exploitation of the forest, lack of sustainable economic opportunities and weak self-management in communities. "By enhancing biodiversity through the application of analog forestry, the promotion of forest garden products and the strengthening of institutional capabilities, villages may yet guarantee solutions." Sustainable development, according to Willie, is that which "occasions efficient management of the environment, economy and democratic community."

Willie concluded his presentation with a brief talk on his experience in establishing a credit facility and delivering its services for the economic gains of the community.

Then came Athula's turn to present. First connected with Neosynthesis Research Center as a volunteer in 1983, Athula started field projects in the Dry Zone and in the Wet Zone, reaching some 45 farming families in Maho and 40 in Welimada. He then attempted to work with 500 farming families in 20 villages in the general vicinity of Bandarawela and the Neosynthesis Research Center. All this was done while facing inadequate resources.

Athula urged for an immediate reassessment of these villages to see where the earlier initiatives now stand. He proceeded to describe in detail the forest garden techniques that he knew. Since he is also representing Lanka Organics (Pvt) Ltd, a company based in Colombo which promotes and markets certified forest garden products, Athula talked extensively about forest garden training and briefly on the certification process. At this point of his presentation, Athula called on Prabath Kumara, a collaborator in his forest garden sites.

Prabath is secretary general of the Future In Our Hands Development Fund. His organization started out doing welfare and charitable works. As the organization pursued this work through the years, it created dependencies in the people it wanted to serve, an experience which taught the members how not to do development work.

The Future In Our Hands Development Fund was founded in 1981 and is based in Badulla. Its objectives are to (a) act as a facilitator in the improvement of the quality of life of the poor, (b) carry the organization's work out among low-income groups, and (c) mediate in the environmental conservation aspects of policy decisions. It has now allied itself with various networks of non-government organizations in Sri Lanka and enjoys the support of many international organizations. It has an annual budget of Rs 5 million.

Prabath concluded his presentation with a report that the current activities of Future In Our Hands Development Fund include social mobilization, group formation, savings and credit, environmental programs, organic farming, biodiversity restoration, children's and women's rights, bio-gas promotion, agro-well construction and children's forums. The areas of operations cover the entire Badulla and Moneragala districts.

The process of certification was presented by Lawrence Goldberg. The only expatriate staff member of Neosynthesis Research Center, an American from northern California, Lawrence has been with the organization for over five years now. His task is to assess and determine compliance with certification procedures and issue the corresponding documents to certification applicants.

Farm products certified as forest garden products using 100% organic production command better prices in the market. In carrying out the certification process, Lawrence wants to know (a) the applicant's name, (b) total area farmed, (c) areas to be covered by the certification, (d) listing of crops for which the certification is sought, (e) whether or not fertilizers, pesticides and herbicides have been used, (f) the manner the crops are harvested, processed and stored, (g) whether or not the farmer keeps farm records, (h) farm machines and equipment used, (i) whether or not the land is irrigated, (j) mosquito control, (k) soil erosion control and (l) water conservation methods applied. Using these data, the certifier helps the farmer achieve Forest Garden certified status.

Certified products sold locally are assessed at 0.5% of selling price. Exported certified products are assessed at 2.5%. The Neosynthesis Research Center is a duly authorized certification body in Sri Lanka.

The delegation from Counterpart International/Philippines outlined its Forest Garden Program in two segments. Edwin gave an overview of the archipelago while Leonardo profiled the strategic direction of the Forest Garden Program.

The Philippines, a country in the Pacific rim of southeast Asia, has 7,100 islands clustered into three major islands, i.e. Luzon, Visayas and Mindanao. Divided into 16 administrative regions, the Philippine landscape presents a picture of a highly threatened environment. The remaining forest, for example, is barely 25% of the original cover (mostly degraded). In the meantime, massive forest destruction continues, as illegal logging and slash-and-burn agriculture continue unabated. Under these conditions, coastal marine life may not survive in the long run as silt on the order of six tons per hectare/per year of mountain topsoil is washed down during heavy rains. Already the water situation in Manila, the nation's capital, is severely stressed and there are news reports quoting authorities saying that water may have to be rationed. Exacerbating this situation is the fact that there seems to be a blind rush in converting watersheds and irrigated lands into industrial estates as the country is being pushed toward a higher gross national product.

In the island province of Cebu, where the Forest Garden Program will initially be carried out, the situation is more bleak. Its forest cover, for example, is down to six percent (mostly degraded) and the poverty incidence is over 55%. With the country rushing to capture a hefty share of the foreign direct investments circulating in the ASEAN region, and Cebu being the second investment destination in the Philippines and the center of political liaison for the entire southern

part of the archipelago, this situation is likely to worsen unless the private sector assists the government in mitigation. Focusing the Forest Garden Program in Cebu will thus contribute to stalling the further deterioration of Region 7 and the island.

To achieve the goals of Forest Garden Program in the Philippines, the country office of Counterpart International is going to initialize the program and carry it out in communities (a) with strong and experienced community-based organizations and (b) easily accessible by public transportation. The program is going (c) to be promoted as an initiative that [i] offers economic options, [ii] undertakes forest, soil and water conservation methods, [iii] works for the protection of prior rights and [iv] attempts to institutionalize communities into self-governing units. It is also going (d) to be connected to the efforts of the Department of Environment and Natural Resources and other government agencies. Enhancing the program's viability, Counterpart International/Philippines will (e) utilize small media [information, education and communications] techniques in the communities where it is undertaken and mass media to drum up wider public support.

The discussion on the Forest Garden webpage was to follow. But, before this discussion, Ranil opted to review the proceedings of the day (November 19) as well as the proceeding day (November 18), going back to refresh the participants with the concepts and strategies of Total Ecosystem Management, Analog Forestry, Biodiversity Restoration and Forest Garden.

David raised a point on the interest of Counterpart International to do marine conservation. He called for the expansion of the landscape. The context of watershed or water catchment in designating the landscape may not be accurate since marine life and coastal aquifer systems are unique in biodiversity and as an ecosystem. Bruce echoed the sentiment of David and proposed that a part of the November 21 schedule be devoted to discussion on forest garden in the context of marine and coastal ecology.

After the points raised by David and Bruce were noted, the participants deliberated on the Forest Garden Program webpage. It was pointed out that Nick was going to develop this webpage from content contributed by Forest Garden staff in Sri Lanka and the Philippines. This webpage is to be integrated into the website of Counterpart International.

Participants proposed that the Forest Garden webpage contain information on biodiversity, forest garden project activities, forest garden products and certification, temple forestry and sacred groves, participatory action, discoveries and innovations, stories from the gardens, marketplace, indigenous knowledge, partnerships and staffing structure. It was also observed that there might be a need to collapse all these subjects under common headings so as not to clutter the webpage.

#### **November 20, 1997/Thursday**

The entire morning of this day, until mid-afternoon, was spent investigating the 16-acre forest garden of Neosynthesis Research Center. The members of the webpage design group were to relocate themselves to the hostel to finalize the framework.

At the Neosynthesis Research Center, forest garden participants battled mosquitoes and leeches to map the forest garden, take a close look into its evolving biodiversity and learn from its staff all the challenges they have encountered in the last 15 years shaping the once denuded Belipola Estate hillside into what it is today. Lunch today was served at the farm's herbarium in celebration of Nick's birthday.

For the webpage discussion, the venue was transferred to our lodging – the Ideal Resort Hotel, where computers were set up for the purpose of allowing participants to familiarize themselves hands-on with the equipment, be exposed to software applications used by Counterpart International and explore Internet connections. Nick opened the session noting a need for reworking the webpages framework/design.

After a lengthy exchange, the headings of the earlier framework were broadened to include related subjects. The matter of biodiversity, for example, now includes conservation and rehabilitation. The subject of indigenous knowledge was combined with forest garden activities, discoveries and innovations, and stories from the gardens. To remain under a separate heading is the theme of temple forestry and sacred groves. A new and stand-alone heading on analog forestry was also agreed upon by the webpage design group. Forest garden products, certification, seed exchange and marketplace are to be integrated into one category heading. The subject of participatory action and partnership is also to be integrated. Staffing and its structure and movements are to fall into a separate segment. Links will have to be incorporated in the webpage.

The webpage design group also recommended the inclusion of a mission statement. Also discussed was the issue webpage maintenance. David said that this issue could be easily addressed by assigning this task to Counterpart International headquarters in Washington DC. He, however, stressed that the development of the content is the responsibility of the Forest Garden Program people and that this should get to the headquarters for integration into its worldwide website.

Nick concluded the session by saying that the design was workable and that he was crafting and presenting this in structural form. In parting, he expressed hope that Sri Lanka and the Philippines could be wired to America Online access connections.

The need to produce a video on Forest Garden Program was brought up. With the in-house capability of Counterpart International to undertake any video and digital compact disc project, this need is not difficult to address. This small session on video production (attended by David, Bruce, Ranil, Nick, Leonardo, Kamy, Lawrence, Atulah and Ajith) then proceeded to situate the Forest Garden Program in current environmental issues as key points of the production. (For example, the approach of planting exotics, it was said, hides the fact that it is actually invasive forestry.) Nick then scheduled the following morning to start the video shoot.

#### **November 21, 1997/Friday**

Just before sunrise, Nick packed up his video shooting gear for an early shoot at the Neosynthesis Research Center. With him were Ranil and Edwin.

At the closing of the session yesterday (November 20), Ranil informed the participants that this day was to be spent in discussion of the marine and coastal aquifer work in Agbopura. The evening was scheduled for presentation by Lanka Organics (Pvt) Ltd, an organization founded to market certified forest garden products, at the Ideal Resort Hotel.

With the Neosynthesis Research Center component of the video shoot fully done, discussion resumed. It went on to tackle the issue raised the other day by David on what was perceived as a limiting definition of watershed or water catchment in landscape concepts.

As a response to the points raised by David and Bruce on the need to expand the concept of landscape beyond watershed and water catchment, Ranil reported that Neosynthesis Research Center is presently looking into the need to reconstruct the coral reefs of Agbopura. While its activities are more focused in watershed areas, Ranil strongly feels that the analog forestry approach will also work in marine restoration undertaking. For one, citizens' participation through community mobilization, as evidenced in forest garden implementation, is almost a universal method for affecting change. It was envisioned that Agbopura might yet become the country's leading site in aquaculture and ornamental fishes. During this session the participants resolved to include in the Forest Garden Program activities aimed at improving the conditions of marine environment and coastal aquifer systems.

Senior officers of Lanka Organics (Pvt) Ltd came in late afternoon to present the nature and business of their company. They were S. Muthusamy (Managing Director), T. L. Raj (General Manager) and Athula Priyanthe (Coordinator for forest garden products).

Lanka Organics (Pvt) Ltd was organized in 1992 in response to a need to market, in Sri Lanka and abroad, certified organic products produced by forest garden communities. It is also now marketing and exporting organic products produced by agri-business firms farming on a commercial scale. Products being marketed and exported by Lanka Organics (Pvt) Ltd now include tea, spices (pepper, nutmeg, cardamom, cinnamon, ginger and turmeric which are all certified products of property-owned forest gardens), coconut, coffee, cashew nuts and herbs.

The process of certification practiced by Lanka Organics (Pvt) Ltd showed that it requires products be certified on the basis of (1) basic information of farm land [expected annual yield of crops and trees, soil samples], (2) inspection by international inspectors, (3) certified farmers maintaining records [of daily activities, composting activities, materials, harvesting, crops and their varieties, etc.] and (4) methods employed in the delivery of the good from farmlands to collecting centers.

The officers pointed out the importance of (a) the establishment of market for products with a premium price, (b) employment opportunities, (c) economic benefits, (d) provision of transport facility to villages and (e) improvement of the standard of living as the economic and social benefits accruing to participating forest gardeners. They outlined their marketing strategy as (a) direct contact, (b) third party contact, (c) promotions and trade fairs, and (d) establishing a website in the Internet. They also said that they have better opportunities because their products are unique in concept and labeling, enjoy a large market, have a widely acceptable brand image and cause the development of new products and technologies.

They, however, stressed they also have their own share of problems and challenges. These are (a) organizing the production base from the point-of-view of coordinating with the farming community, resource constraints and lack of mobilization techniques, (b) securing the supply base vis-a-vis competition and the volatility of price and market, (c) establishing consistency in quality of raw materials and processing, and (d) limitation of monetary resources for purchasing, the setting up of processing facilities and market research.

Questions from the participants centered on (a) the bulkiness of the recording system to be complied with by the farmers who might lack the literacy to do so, (b) the motivation needed to shift from inorganic farming to organic, (c) the apparent profitability of the venture vis-a-vis the

clear lack of new investments, (d) on the assumption that there is a binding contract between the organization and the farmer, how is the contract negotiated and on what basis, and (e) the tenurial rights of the farmers

Lanka Organics (Pvt) Ltd is located at 23 Braybrooke St, Colombo 2, Sri Lanka. Its telephone numbers are 300155 and 336326 and its fax number is 336325. It can also be contacted through (email address) lankorg@sri.lanka.net

#### **November 22/Saturday**

Leonardo, Kamy, Ajith, Edwin, Roshan and Nilmini followed David, Bruce, Ranil, Nick and Lawrence to Nuwara Eliya. A strategy meeting was held on the Philippine component of the Forest Garden Program, attended by David, Bruce, Ranil and Leonardo.

The organization of Philippine Forest Garden Products, Inc. was discussed, and is intended to impress upon farming and village communities the availability of a facility to procure and market certified garden products. Leonardo was also tasked to write the concept paper of this strategy.

After lunch, the group split into two. Ranil, Kamy and Lawrence went ahead to Colombo to arrange a meeting for David and Bruce with a Canadian funding agency doing environmental work in Sri Lanka. David, Bruce, Nick, Leonardo, Ajith, Edwin, Nilmini and Roshan first went to Nuwara Eliya botanical garden before proceeding to Colombo. The purpose of the visit to Sri Lanka's premier botanical garden was to find endemic flora and fauna not found elsewhere in the country. The group in Colombo already late in the evening.

#### **November 23, 1997/Sunday**

At 8:00 A.M. David, Bruce and Nick, together with Ajith, Roshan and Nilmini, left for Galle enroute to Colombo. Leonardo and Edwin, with Athula as guide, set out at 10:00 A.M. to visit forest garden sites in Welimada and Bandarawela.

The trip to Galle and Southern Sri Lanka was related to Forest Garden plans in the Kanneliya Rain Forest tract – the second largest rainforest remaining in Sri Lanka. Plans for creating a forest corridor between Kanneliya and Sinharaja were discussed with government officials and the director of Rainforest Concern, a UK-based nongovernmental.

Leonardo, Edwin and Athula visited seven forest gardeners in two forest garden sites. They talked to four forest gardeners in the Welimada site and three in Bandarawela. Since the plan was to visit forest gardens in different phases of development, Leonardo and Edwin saw farms in extremely distinct stages and talked to participating farmers who expressed varied interests in the project. It was learned that Athula started forest gardens in these two sites in 1992. In 1995, at the time when the community was still learning the mechanics of forest gardens, farm production and social mobilization, Athula had to conclude the project due to a lack of funds.

#### **November 24, 1997/Monday**

At 10:00 A.M. Leonardo and Edwin started their trip to Colombo. They arrived in the capital city of Sri Lanka at 4:00 P.M. and proceeded straight to Galle Face Hotel to rest.

#### **November 25, 1997/Tuesday**

The group took a day off to rest, do laundry and attend to personal needs.

**November 26, 1997/Wednesday**

This day was scheduled for a debriefing on the seminar/workshop. Also scheduled were David and Bruce signing a memorandum of understanding with the Southern Development Authority for Forest Garden and elephant conservation activities, and discussion on administrative matters with Ranil, Kamy and Leonardo.

With David facilitating the session, the debriefing was attended by Bruce, Ranil, Nick, Leonardo, Kamy, Edwin and project officers of Neosynthesis Research Center (namely, Ajith, Atulah and Willy). For the partners in Sri Lanka, the conduct of the Forest Garden Program will occasion the correction of earlier mistakes, improvement on the methods and achievement of forest garden goals. For the delegation coming from Counterpart International in the Philippines, the Sri Lankan experience with forest gardens will provide insight into the forest as habitat, precautions in implementation, the drive needed to achieve the objectives of the program, long-term direction in terms of institutionalization within the country, etc.

In the afternoon, David, Ranil, Leonardo and Kamy gathered in Bruce's room to discuss administrative and financial matters. Considerable time was spent in discussing all reporting procedures and financial forms. The matter of the matching grant was also examined. Responsibilities at the field level of the Forest Garden Program were defined.

*End Of The Seminar/Workshop*

September, 1998



*The logo depicts a Hummingbird (Spingid) moth feeding on a Musa flower. Hummingbird moths (Spingidae) are found in all rain-forest environments. They disappear with forest destruction but return when habitat has been re-established. Musa sp (Musaceae) belongs to a genus of plants that is found in all rain-forests and re-establishes the rain-forest environment rapidly.*

# Forest Garden Products

## A STANDARDS AND PROCEDURES MANUAL

*compiled by*

*F. Ranil Senanayake*

The Neo Synthesis Research Centre, Sri Lanka

©

## INTRODUCTION

The destruction of tropical forest environment not only impoverishes traditional people, it is also a great loss to the entire world. This destruction must be stopped, for so much has been lost in the past few decades that if we are to make any difference to the world of the future these trends must be reversed. With this goal in mind, the Neo Synthesis Research Centre (NSRC) in Sri Lanka began a series of experiments in analog forestry. Here, forests analogous to the native forest in structure and ecological function were established containing trees that yielded valuable products. This work also demonstrated that if all crops in these new forests were grown organically, many species of animals and birds that were once confined to the original forest could move in and establish populations.

Today, many villages in Sri Lanka participate in creating these analog forests, aware that the cultivation of organic produce protects both their children and their environment from poisonous chemicals, and aware that the planting of tree crops in this manner has helped replace some of the lost rain-forest.

Forest Garden Products are collected exclusively from such forests. The consumer of these products not only purchases the finest, cleanest and freshest herbs and spices on the market, but also contributes to a change in the lifestyles of tropical subsistence farmers and helps reverse the trends in tropical rain-forest habitat destruction.

The purpose of these standards is to clarify those practices and materials that are allowed or prohibited in NSRC's certification system. These standards define the minimum conditions for certification in accordance with the principles of Analog Forestry. Certification is a statement of method and the recording of an audit trail where any claims made by the producer or certification officer, may be verified by a third party.

## HISTORY AND PROCESS

The Neo Synthesis Research Center (NSRC) conducted the first Forest Garden Product Certification inspections in August 1984. The crops covered were Coffee and Cardamom. The inspections were based on early versions of the questionnaire series presented later in this book. As this certification system sought to look at biodiversity and system sustainability as fundamentally important performance indicators it was important to affirm the scientific basis of the certification system. Thus at the inception, it was required that inspectors have at least a masters degree in biological sciences.

The first Chartered Inspector of the Forest Garden Product (FGP) certification system NSRC, Dr Ranil Senanayake, went onto Australia to become an Inspector of Organic Produce for the National Association of Sustainable Agriculture Australia (NASAA) from the period 1989-1991. He also became their first International Crops Inspector. During this period, the development of a sampling technique to cover traditional grown coffee in the mountains of Papua New-Guinea for NASAA demonstrated the utility of biodiversity as indicators. This study also made clear the importance that organic management has on the quality of a FGP.

In 1991 the FGP certification system was beginning to develop fast. Organic production inspection and social development criteria were clarified as criteria for examination in the inspection system. In response to the following advertisement circulated in October 1992, the idea of developing an international network to extend Analog Forestry was developed

"NSRC is the only organization that certifies Forest Garden Products, that flow from a process called Analog Forestry (AF) Analog Forestry was developed as a response to the loss of tropical rainforest biodiversity It is a system of silviculture that creates a forest analogous to the natural forest in architectural structure and ecological function, but can be comprised of crop plants and exotics The products are grown organically and help re-establish rainforest habitat in deforested areas NSRC also maintains a research and training facility at its headquarters and is extending its program to other countries Membership dues are \$20 00 which entitles members to our newsletter " (advertisement - October, 1992)

The idea for a *network in Analog Forestry* was first suggested at the national level for Sri Lanka after a joint workshop sponsored by The Neo Synthesis Research Centre (NSRC) and The Asia Foundation. The workshop conducted on the 27-28th of August 1994, brought together many administrators, bureaucrats, NGO's and community groups to study the landscape of the Bandarawela area in Sri Lanka. The study was conducted to examine the concepts in Analog Forestry, Landscape Design and Integrated Resource Management, as management resources to attain a 'Viable Economy and Sustainable Watersheds'

The group visited trials designed by NSRC and for the first time entered into a dialogue about the environment with the so-called peasant or villager' Everyone was impressed with the depth of knowledge they had gained from the NSRC agricultural extension service and the ease at which the local community could 'internalize' the information. The ecological information that they received explained their daily experience logically The sense of knowledge gained from this fruitful synthesis of tradition and science, had even created a village drama that explains the basis of their well known woes such as when small scale agriculture clashes with monoculture tree plantations

The experience gained from the extension work suggested that the concept should be examined in a wider context. Thus the Environment Liaison Center International (ELCI) of Nairobi, Kenya was invited to look into the possibilities of an international workshop

The First International Workshop on Analog Forestry was held in Sri Lanka (April 7-3, 1995) This workshop was sponsored by Canadian International Development Agency, CIDA. It was attended by eleven participants from seven countries The workshop was conducted as a field training exercise where the lectures were conducted while visiting the examples being discussed Every evening, a summary of the day's events and discussion on the subjects covered was held The workshop consisted of two categories of attendees, the workshop participants and observers The workshop participants were from NGO's that had committed themselves to field projects, and who were familiar with and were networking the concept of Analog Forestry in their own countries The network objectives were extensively discussed and agreed upon.

In 1997, the first ever 'Manual of Analog Forestry' was published by one of the network members, Falls Brook Centre, Canada in English and Spanish and widely distributed

The network also took on the responsibility of managing the FGP certification process at the meeting in Madre de Dios , Peru in May 1998

## NETWORK OBJECTIVES

The objectives of the network are

- 1 To develop the use and extension of Analog Forestry in their local areas
- 2 Examine ways and means by which natural biodiversity and environmental stability can be gained through forestry systems
- 3 Develop a credible international certification system for Forest Garden Products (FGP)
- 4 Develop a market for certified products through the activities of the network.
- 5 Maintain a good communications and information exchange link with the network members
- 6 Develop an effective seed exchange program between members

## MEMBERSHIP

The rules of membership as agreed to, at the meeting in Madre de Dios , Peru in May 1998 are,

- 1 Full membership will only be open to institutions
- 2 Associate Membership is available to those interested in working with the network but who do not conform to the requirements as listed below

### *Full Members should be*

- 1 A registered NGO in the country of application.
- 2 Involved in an 'hands on' application of biodiversity development or environmental rehabilitation projects
- 3 Be introduced by a current member
- 4 Have the capacity for independent action.
- 5 Be current in all dues
- 6 Not be involved in any conflict of interest activity with regard to commerce and certification.

### *Associate Members*

- 1 Will have access to all network activity except voting on network matters
- 2 This category of membership is open to individuals, organizations or institutions

## DEFINITIONS

### *1 What is an Analog Forest Garden?*

An Analog Forest Garden is a tree dominated environment established on the principles of Analog Forestry, where crop plants are grown so that they form a physical structure analogous to the original forest. This planting exhibits ecological relations that are also analogous to those of the original forest and provides micro-habitat to many species that could not exist without it. The farmers certified as growing Forest Garden Products further confirm the sustainability of these habitats by growing their crops on a strictly organic basis. This precludes the application of pesticides, fungicides, herbicides and artificial fertilizer, so that the forest habitat is allowed to mature into a system of high biodiversity.

### *2 What are forest garden products ?*

Forest Garden Products (FGP's) are grown by farmers whose practices have been certified to contribute to agricultural sustainability, biodiversity conservation and environmental stability.

Forest Garden Products are collected exclusively from these forests. Thus, the consumer of these products purchases the finest, cleanest and freshest foods on the market and contributes to a change in the lifestyles of tropical subsistence farmers to help reverse the trends in tropical rainforest habitat destruction.

In addition, farmers certified to produce Forest Garden Products, have to comply with the standards of organic agricultural production, where the products are of high nutritional value and have no synthetic inputs applied to them at any stage.

### *3 What is Analog Forestry ?*

Analog Forestry is a system of silviculture that seeks to establish a tree dominated ecosystem, analogous in architectural structure and ecological function to the original climax or sub-climax community that once existed in the area of treatment. The function of a forest can be measured by a number of variables. For instance, the functions of providing micro-habitat, clean water, produce and environmental stability. A recognition of these functions and modeling to meet with their needs, will be an important feature of this system of silviculture. It seeks to mimic the form and function of the original forest but can be comprised of some exotics. Usually, it requires greater levels of management and human intervention which are the key characteristics of such systems.

Analog forestry is a forestry technique that allows for the development of a physical structure similar to the climax forest and recreates a modified environment allowing many species of the original forests to extend their ranges. The function of a forest can be measured by many variables including the provision of micro-habitat, clean water, produce and environmental stability. Analog forestry recognises the varied functions of a forest and is modeled to meet with those needs. It is a very effective tool in arresting biodiversity loss. It provides a greater range of crops and spreads the risk of the individual manager. It also provides specialised products of high value or products amenable to community level processing, as well as providing the highest carbon sequestering value of any silvicultural practice.

In the context of Analog Forestry, a forest is defined as an ecological climax community that any geographical area can attain without the intervention of humans. Thus, forests will range from

Brazilian Rainforest to Australian Bush. The most important feature is that such forests are natural formations. Forestry, on the other hand, has all to do with human intervention. It is the art and science of managing forests. As human impact on natural ecosystems increases, the heavier becomes the burden upon the practitioners of this science to ensure that the stability conferred on the biosphere by natural forests continues uninterrupted. This is accomplished by two principle methods. The first is by the conservation of natural forest resources, the other by creating human made forests. However, the nature of such human created forests has to be carefully designed.

Analog forestry encompasses the diverse forms of tree farming termed Village Forests, Forest Gardens, Mixed Tree Farming etc. This type of activity being recorded in many traditional societies, seeks to develop its models based on the traditional paradigm. It attempts to create a physical structure and a set of ecological relationships that is analogous to the natural climax state, or end condition of an ecological process termed "succession", by using trees and plants similar to the natural structure, and being useful to humans as crop plants.

Succession begins on newly cleared land with fast growing weedy species called colonizers who change their immediate soil and surface environment by their life's actions. This change in turn, creates a micro-climate amenable for the growth of more woody, longer lived species. These latter species in their turn, create micro-climates suitable for the seeds and seedlings of larger trees to survive. This process continues until no further changes occur, usually culminating in a mature forest termed the 'climax state'.

Studies in some tropical countries suggest that a process mimicking ecological succession is practiced in many rural areas. Here the natural seral stages are followed by the farmer but forest species are substituted by species of utility to man. While much of the hill zone villages of Sri Lanka possess rudiments of forest 'analogues', its potential for development was not recognized until 1982, when experiments on design and development of these analog forests were begun at the Neo Synthesis Research Centre (NSRC), Mirahawatte.

These experiments confirmed the ecological and economic validity of such plantings. In the experiments conducted, an increase in soil organic matter, water regulation and dry weather flow, economic yield and wildlife species was recorded. The information gained has been extended to the village with a view to upgrading the ecological and economic value of village land.

#### **INTENT OF THE CERTIFICATION SCHEME :**

The intent of NSRC's Forest Garden Product (FGP) certification scheme is the development of a sustainable rural ecosystem as well as the concurrent development of biodiversity. The implementation of such activity on a landscape scale will answer much of the needs of food security as well as economic viability. The scheme is also designed to respond to the goal of creating long term, carbon sequestration pools. This certification of Forest Garden Products is aimed at a gain in biodiversity, systems biomass and landscape sustainability which serve as distinct goals that go beyond typical organic certification.

NSRC will support Analog Forestry/Landscape management goals by ensuring that the certification system will

\*Ensure that all stages of production, packaging for transport, processing and marketing are covered by inspection and certification requirements

\*Encourage the development and acceptance of the certification system by government, inter-governmental and commercial organizations

\*Promote the system, by public education, publications, and publicizing of the logo

\*Protect the integrity of the system and guard against fraudulent claims in the marketplace

### **General information for all applicants**

There must be evidence of organic rotation of short duration in the annual fields maturing to organic rotations of long duration in the perennial fields

Maintenance of certification status and progression to higher levels is dependent on all conditions in the contract of certification being fulfilled

A grower may apply for certification for only a portion of the farm if it is a step in the progression to certify the whole farm. This is provided that the remaining areas of the farm are managed under the requirements for certification.

The burying of non humified material to add to soil carbon storage is disallowed.

Farmers should check all planting material for disease or stunting. All planting material should be of high quality and any new or exotic planting material should be passed through an 'Ecological screen' (Table 1)

**Table 1**                      **ECOLOGICAL SCREEN**

An ecological screen for species to be used in Analog Forestry applications. The mesh can be set for the particular sensitivities of a tree-dominated ecosystem.

1 Growth Habit	
1 1	Tree
1 2	Shrub
1 3	Forb
1 4	Grass
2 Position of the Canopy in the Ecosystem	
2 1	Dominant
2 2	Sub dominant
2 3	Shade Adapted
3 Growth Rate	
3 1	Rapid
3 2	Medium
3 3	Slow
4 Growth Habits	
4 1	Invasive
4 2	Aggressive
4 3	Co-dominant
4 4	Micro-habitat obligate
5 Feeding Habits	
5 1	Gross feeder
5 2	Community feeder
5 3	Partial Parasite
5 4	Total Parasite
6 Nutrient Cycling	
6 1	Nitrogen fixing
6 2	High retention of soil carbon
6 3	Low retention of soil carbon
6 4	Mineral sequestering capability
7 Propagation	
7 1	Seed
7 2	Stem and Root cuttings
7 3	Root suckers
7 4	Corms and tubers
8 Seed Weight	
8 1	Light
8 2	Medium
8 3	Heavy

9 Seed Viability

- 9 1 Under 10 days
- 9 2 Under 30 days
- 9 3 Under 3 months
- 9 4 Under 1 year
- 9 5 Over 1 year

10 Dispersal characteristics

- 10 1 Wind
- 10 2 Water
- 10 3 Gravity
- 10 4 Animals (externally)
- 10 5 Animals (internally)

Table 2 TEMPLATE FOR TESTING NEW SPECIES FOR TRIALS

1 Species name

2 Does it exist in country? Y/N (if N go to 2, if Y continue)

- 2 1 Is it common or rare? Y/N
- 2 2 Does it have utility functions? Y/N
- 2 3 What functions?
- 2 4 Any recorded problems?

3 Is it a r-selected or k-selected\* species? (If r go to 4, if k go to 5)

4 Has it demonstrated a propensity for weediness or invasion? Y/N

4 1 Where and in what manner? (If serious, reject)

5 Is it a carrier or vector for viral diseases? Y/N

5 1 Detail (if serious, reject)

6 Are there any phytosanitary regulations against this species in your country?

7 Obtain the opinion of the Department of Agriculture and Department of Forestry  
If okay, approve for trial. If not, abandon.

The completed score sheet should be sent to an advisory board set up by the organisation responsible for the importation of the genestock for approval or disapproval.

*\*The reproductive habits of species is a key determinant of their invasive potential r-selected species reproduce rapidly and in great numbers though the survival rate is low This creates the potential for rapid colonization of an exotic environment. On the other hand, species that are k-selected, reproduce less frequently and in smaller numbers with a greater emphasis placed on survival k-selected species pose less of a danger to an exotic environment.*

Table 3

SEED EXCHANGE CONTRACT

I,

OF

CLAIM OWNERSHIP OF THE SEEDS LISTED BELOW AND RECOGNISE  
MY OWNERSHIP RIGHTS OVER ALL ASPECTS OF MY PROPERTY IN  
GIFTING THESE SEEDS TO  
OF

I VOLUNTARILY TRANSFER ALL OWNERSHIP RIGHTS ACCRUING FROM  
MY OWNERSHIP TO  
ON THE UNDERSTANDING THAT THESE OWNERSHIP RIGHTS TO BE  
TRANSFERRED INTO PUBLIC DOMAIN

signature of owner

signature of recipient

Accompanying documentation

- 1
- 2
- 3

## Guidelines for Certification

### Biodiversity

Biodiversity is the measure of the diversity of genes, species or ecosystems at any spatio-temporal point. It does not mean wild, endemic, rare or even native, merely the measure of diversity. Biodiversity is an attribute of a system, where value can be expressed as a measure of its components. Thus, rainforests with their high biodiversity have been identified as regions with high value in diverse market products. At present, mainly expressed as a low biomass/value timber product.

Biodiversity, in any landscape, must be measured as two states - natural and anthropogenic.

Natural biodiversity exists as a product of a long history of interactions between organisms, landscape and climate. It is high in some ecosystems and low in others. The natural biodiversity of stable ecosystems provide the indicators and measurements that define a sustainable state. A loss of biodiversity on the other hand, means a loss of a variety of organisms that comprise that ecosystem and suggests disturbance and unstable states.

Anthropogenic ecosystems are those influenced by humans in such a manner that their natural evolutionary processes are massively disrupted. Most rural land other than natural ecosystems are regions where exotic species replace native species to some degree. But all agricultural and other anthropogenic land use systems, also have a biodiversity measure or value. As represented by its biological components, if the frequency or intensity of disturbance in any area is high there is a loss of biodiversity. If the frequency or intensity of disturbance is low there is a corresponding gain in biodiversity. This gain is obtained through a hybrid population of natural and exotic organisms. There is a correlation between the increase in biodiversity and the establishment of stability in disturbed systems.

In the process of certification this distinction is always made. Certification for the management of natural systems will preclude the use of exotic species, while the certification of anthropogenic systems will include the use of Exotic species.

This relationship also holds in anthropogenic ecosystems such as agricultural fields where the development of biodiversity demonstrates clear links to the development of sustainability. Thus, biodiversity is a very effective summary of the prevailing ecological condition. Studies on agricultural diversity are often correlated with environmental stability. A rapid loss in the degree of biodiversity, for instance suggests a loss of ecological stability. Therefore, the measure of biodiversity is a useful indicator of the health of an ecosystem. Biodiversity development is a fundamental criterion in FGP certification. Biodiversity will be developed as an active management goal as well as an indicator of a system's health. Biodiversity will be considered as both anthropogenic biodiversity and natural biodiversity. Although our production systems are essentially anthropogenic, indicators of success are always drawn from elements of natural biodiversity (See *annexure 1*). The relative measure of biodiversity is considered a valid indicator of management success.

### Indicator Species\*

Indicator species refers to those species of plants and animals that indicate or identify the ecological state of the environment under investigation. Indicator species are used widely by inspectors to determine the status of the farm.

They are also useful to determine the application of prohibited substances. Indicator species are classed in three stages, I, II and III, each indicating the specificity of the organism to increasing states of maturity of the ecosystem. The list for Sri Lanka is noted in *Annexure 1*

### Annexure 1

#### INDICATOR SPECIES FOR FGP CERTIFICATION IN SRI LANKA

Stage I	Stage II	Stage III
	<b>Mammals</b>	
Mouse deer, Barking Deer, Toddy Cat, Pangolin, Porcupine Giant squirrel	Loris, Flying squirrel, Fishing cat	Nillu Rat
	<b>Birds</b>	
Wood Pigeon, Jungle fowl, Blue face Malkoha, Black fronted Babbler, Brown capped Babbler, Black Bulbul	Ceylon Shama, Crested Drongo, Green Billed Coucal, Yellow eared Bulbul	Red-faced Malkoha, Spur fowl, White headed starling
	<b>Reptiles</b>	
Hypnale nepa, Boiga ceylonensis, Ahaetulla nasutus	Green pit Viper, Bungarus ceylonensis, Python, Calotus leolepis, Lyrecephalus scutatus	Boiga barnensis, Crysophelea ornata, Cophotis zeylonicus, Balanophis ceylanicus
	<b>Butter-flies</b>	
Blue mormon, Tamil lace wing,	Bird-wing	Tree Nymph, Blue oak-leaf
	<b>Amphibians</b>	
Philautus halii, Polypedatus cruciger, Polypedatus eques, Polypedatus microtypanum type A, Ichthyophis spp	Philautus leucorhinus, Philautus variabilis, Polypedatus longmosus, Polypedatus microtypanum type B, Polypedatus cavirostris, Bufo kellartii, Rana temporalis	Philautus sp G, Philautus sp H
	<b>Plants</b>	
Dendrobium macrostachium, Pteris bionita, Nephrolepis exaltata	Dendrobium macarthaie, Asplenium nidus, Cyathea cyanata	Anectochilus cetaceous, Lycopodiums, Featherly ferns, Cyathea walkeri

## Soil

The condition of the soil in a certified garden is very important. The profiling should be analogous to that found in the natural forest systems. While the mineral component of soil is addressed under 'Environmental Sustainability', the soil ecosystem is one of the principal areas of interest to both the designer and certifier of AF systems. Soil fungi serve as efficient indicators of the state of the ecosystem. The maintenance of a high degree of native soil organisms should be part of the management design. Indicator species can be drawn from the macro-organism pool as indicators. The carbon pool of the soil should be evaluated in terms of volume and residence horizons.

The carbon sequestering value of AF systems is gained by a management system that seeks to maintain a canopy cover over the land under Analog Forestry for the longest possible time horizons. This is accomplished in the above ground component by maintaining the mature state of the forest and by the use of long term maturing species like Ebony (100 years) in the architectural design and by managing the forest soils so that long age humates accumulate in the A and B horizons.

The photosynthetic activity of plants takes carbon dioxide out of the atmosphere and fixes it in a solid state as organic matter. This act of sequestering carbon is what provides forest biomass. Its quality, in terms of sequestering value has to be measured in time. While all plants sequester carbon, trees and woody plants are most efficient as they produce resistant compounds such as lignin. Consider the fate of two photosynthetically derived objects of similar biomass - a large pile of seaweed and a log lying on a beach. Both are plant products, but one (the tree) is strengthened with lignin. The same biological, chemical and physical forces will impact both. The seaweed will have disappeared within a few weeks the log may remain more or less the same for years. But wood cannot be accounted for at one rate or value in terms of carbon sequestering. Just as there is a measurable qualitative difference between wood and seaweed, there is an equally distinct difference between the wood from different trees. An important attribute of the wood in terms of its sequestering value is its durability. Natural durability is a reflection of the wood's ability to withstand the attacks of decay organisms. Archeological finds often demonstrate wooden construction items dating back about 1000 years. In America a durability standard has been devised by using White Oak as the standard. In this method of evaluation White Oak is given a rating of (100). Wood with higher scores such as Red Cedar (150-200) or Black Locust (150-250) are more durable. Woods with a lower score such as Hemlock (35-55) or Birch (35-50) are less durable.

For the purpose of sequestering carbon the most productive forests are those that have a long standing life as well as a high potential to develop deep organic soils. Commercial monocultures have a disadvantage in this respect as they are harvested for timber after a set period of time and develop deep organic soils very rarely. A better model is provided by polycultures with long rotation times, such as that seen in some forms of traditional forestry where a high diversity of tree species with a good development of organic soil has been recorded. Further, as the trees used in this approach to forestry are crop species which produce large crops as the trees mature, there is a disincentive to fell the trees unless they are diseased or very old. The development of this type of

forestry in some temperate and tropical regions can provide a very efficient method of sequestering carbon, that also provides social, ecological and economic benefits

As AF treatments have very high carbon sequestering values It often provides a 'multi value' crop that could add substantially to the value of lands so treated

## Soil Management

Thus, soil management processes must be evident in the design and planning of an analog forestry system. This must include attention to erosion control and nutrient loss through wind or water action. The action of the loss of organic matter through oxidation or through the use of inappropriate plant species is not allowed. The soil must be treated as an ecosystem and managed to sustain the highest level of natural biodiversity. The conservation of long aged matter as a response to carbon sequestration will also be encouraged.

Soil management in the context of these standards implies an active soil development program that seeks, through the planting of trees with identified potential, soil organic matter growth and the addition of composts or minerals to create a mature soil ecosystem. The results of soil management programmes will be evaluated quantitatively by measuring the depth of soil organic matter and qualitatively by the presence of indicator species, soil tilth and the speed of incorporation of surface amendments.

## Water

Water is usually found on a landscape as surface water or as sub-fossorial water. The manager should attend the quality of both. In most forest systems the soil water relationships and surface water filtration are affected significantly by the vegetation. The condition of the water is assessed on the land and at outflow points on the land. The planting design must address the hydraulic systems on the land.

The value of aquatic ecosystems lie in their productive and biodiversity conservation functions. The current trends to use the surface drainage systems to flush the wastes of human activity reduces the ecological potential as well as economic potential. In designing water sources to function in a way analogous to the forest systems, indicators of the value of the aquatic ecosystems must be rooted in biodiversity and water chemistry indicators.

## Environmental Sustainability and Landscape stability

In this process of certification Environmental Sustainability is considered to deal with the physical environment and monitored by using measures such as water quality and nutrient balances, mineral transport, physical erosion etc

For instance, water quality will measure variables such as, clarity (using a photometer or secchi disk), sediment load (using settling techniques), conductivity, acidity, heavy metals, organophosphates etc. These measurements are recorded under the 'water quality' section of the Inspectors Form (*Annexure 6*)

Soil status is measured as the potential or experienced erosion of the body of the soil. Gully formation and other landscape problem features will also be recorded under this variable

The position of the farm on the landscape is an important attribute. If for instance, other farms above creating erosion or biocide input problems. The interpretation of the landscape has also to take in abiotic features such as rocks that could add to the sustainability of the environment by providing filtering and flow mitigation effects

Quarrying and other forms of exporting natural mineral rock from the landscape is seen to be non sustainable

## Canopy cover and quality

Canopy cover and canopy quality are very important and vital elements of a forest and therefore, of an Analog forest. They are important variables in overall point assessment of any property seeking certification.

Canopy cover is a measure of the percentage representation of the original canopy cover. The measure of canopy cover gained in the target vegetation type to design after sets the ideal state. In practice it is being found that once 60% of original canopy is gained, maturity increases rapidly. Thus 60 % original canopy is the contractual target in certification.

Canopy quality is a measure of the canopy that looks at its potential to provide microhabitat or to increase the potential of aerial water harvesting. In the measure of canopy quality, biodiversity provides efficient indicators. Canopy quality is a feature that inspectors should note in their reports, preferably with some identified indicator species so that baselines can be established

In gardens that are being developed, the increase in value of both canopy cover and quality\* will function as a primary indicator of success

for off-target poisoning (birds) or washing on to soil. These traps should be placed in headlands, pathways or other non-crop areas adjacent to the crop itself. Use of metaldehyde should be in addition to cultural and physical controls and should not be a substitute for sound management practice. Rodent baits in the field, packing sheds and storages must be placed within a bait box and changed regularly. Dead rodents must be disposed of immediately.

While certain natural pesticides or other products are allowed, it is important to understand the safe use and handling of any pesticide application equipment. Complete personal protection gear should be worn and workers trained in safe handling and storage practices.

Wherever possible, pests and their natural control agents should be monitored to determine the need for applied controls. In most instances, natural processes will restore the balance naturally.

The use of specific flowering plants as a food source and habitat for beneficial animals, insects and mites is highly recommended.

### **INSECTS, NEMATODES, MITES**

Biological preventative methods such as the encouragement of predators, the use of sexual lures (pheromones), sterilised males, decoys, and strategic planting are recommended. The use of derris, diatomaceous earth, quassia, soft soap, white oil emulsion, winter oil, herbal, bio-dynamic and homeopathic preparations and biological controls such as *Bacillus thuringiensis* are allowed. Pyrethrum is allowed but growers must obtain pyrethrum without toxic agents such as piperonyl butoxide. The provision of predator habitat is highly recommended.

### **WETTING AGENTS AND SPREADER STICKERS**

Natural agents such as pure soap (soft soap castille), vegetable coconut oil are preferred wherever possible. Other agents should be referred to the Certification Office for appraisal.

### **FUNGI**

Preventive methods such as spacing for air flow and planting time strategies are recommended. Treatments such as potassium permanganate (as a seed dressing only), sulphur, lime sulphur, bordeaux, copper sulphate, sodium silicate (waterglass), herbal, bio-dynamic and homeopathic preparations and seaweed extracts are allowed. Copper hydroxide and copper oxychloride are permitted at this time but the use of copper oxychloride is restricted.

### **WEEDS**

Methods such as the use of rotations, mulching, companion planting, soil solarisation, mechanical means, grazing, natural oils (vegetable and animal), natural acids (e.g. vinegar), biodynamic preparations, heat treatments and planting time strategies are permitted for weed control. Biocontrol agents may be permitted after appraisal by the Certification Office.

Heat treatments or thermal weeding, including use of steam or hot water is permitted.

Natural mulch is a cover of organic material on the top of soil. Any material produced as per these Standards is permissible. Other permitted materials include untreated sawdust, wood shavings,

## **Approval procedure**

- 1 Secretariat prepares complete sets of the submitted paperwork for two Certification Committee Members (CCM)
- 2 The CCM send their approval/disapproval of issue of certificate to the secretariat  
*Annexures 7 and 8*
- 3 Secretariat inscribes the applicant in the certification record and issues certificates  
*Annexure 9*
- 4 The secretariat communicates the disapproval to unsuccessful applicants  
*Annexure 10*

## **Appeals**

All appeals will be made to the Director, NSRC They must contain a set of the applications and inspection documents and a detailed explanation as to why the applicant feels that his/her inspection should be reviewed

On receipt the Director will request a board member who was not one of the examining committee members to review the appeal

The findings of the board member will be communicated to the Certification Committee and a response prepared

The director shall inform the appellant of the outcome of the appeal

## **Monitoring and re-inspection**

Monitoring will be conducted on a random basis as determined by the Certification Committee

Re-inspection shall be done annually for three years After Level 'A' certification for three years  
The period of re-inspection shall extend to once, every three years

## **Use of the certificate / confidentiality of applicants data:**

The certificate will be issued in the name of the applicant (farmer or land manager) with direct responsibility for managing the land certified The certificate must accompany the product in wholesale form. If retailed in raw form the certificate number will appear on the pack The certificate is valid to be used in national sales, but needs to be endorsed for export sales A cess of 2% will be paid by the exporter to the certification office *Annexure 11*

All applicant data will be treated with strict confidentiality

Conditions applying to specific commodities as in the production of all food under FGP certification, implies a conformity to standard organic production procedures. It will be seen from these standards that much of the management processes for Forest Garden Products are also in conformity with the needs of organic production needs.

### **Processors**

Food processors such as cashew roasters or tea manufacturers will need to set aside special machinery for certified products or demonstrate the ability to keep the machinery (Dryers, Roasters, Grinders, etc) free from the contaminants of non-certified products.

### **Packaging for Transport**

### **Marketing**

#### **Animal Husbandry**

Animal husbandry in a forest garden can follow two routes, extensive and intensive. In the extensive route, the animals are maintained in free and feral conditions, examples are bee-keeping and traditional buffalo management. Under such extensive culture it is the responsibility of the farmer to insure that the animals do not stray into areas affected by neighborhood spraying programs or into areas where they can be subject to the effects of contamination.

Under intensive culture the animals will be maintained in conditions that allow them to

- \* conduct their basic behavioural needs
- \* be maintained in good health and sanitary conditions
- \* observe natural reproductive techniques
- \* be fed on 100% organically produced food
- \* Feed production to be tailored to the local bio-region.

*Annexure 12*

**RATES APPLICABLE.**

*(for Sri Lanka)*

*For Farm Inspection*

Application Form Free

Certification booklet Rs 100 00

Inspection fee Rs 2000 00/ day minimum plus traveling , lodging and food

Average farms serviced per day under 2 Acs 4, Under 20 acs 2,  
over 20 - 100 acs 1 Over 100 acs negotiated rate

On successful completion of inspection, certificate will be issued

If export validation of the certificate is required there will be an export cess of 2%

*For Processor Inspection*

Application Form Free

Certification booklet Rs 100 00

Inspection fee Rs 4000 00/day minimum plus traveling, lodging and food

On successful completion of inspection, certificate will be issued

Re-inspection annually

*Tree Plantation* = Formal systems of silviculture

Tree Plantations are tree dominated anthropogenic ecosystems containing native or exotic species, usually of a single age class, managed according to scientific principles, is managed on short (under 30 years) rotations and functions as short term carbon sinks

*Polyculture*

The use of many species and techniques in planting and management design.

*Monoculture*

The use of one species in cultural practice in planting and management design

*Forest Plantation* = Informal systems of silviculture

Forest plantations are tree dominated anthropogenic ecosystems containing native or exotic species, managed according to scientific or traditional principles, and managed on long (over 30 years) rotations, consists of many age classes and functions as long term carbon sinks

*Traditional*

The use and management of tree species to create a tree dominated ecosystem according to traditional knowledge systems This system generates polyculture tree plantations

*Analog*

The use and management of tree species to create a tree dominated ecosystem analogous to the natural forest, using scientific knowledge systems This system generates polyculture tree plantations

*Industrial*

The use and management of tree species to create a tree dominated ecosystem that is designed to produce a single crop in the largest quantities over the shortest possible time period, using scientific knowledge systems This system generates monoculture tree plantations

*Home Garden*

A tree covered domestic compound that has at least 40% of the shade levels of the original forest

*Analog Forest Garden*

A tree covered domestic compound that has at least 80% of the shade levels of the original forest

*Agroforestry*

### *Permaculture*

### *Biodiversity*

Refers to the measure of diversity of species or genes at any spatio-temporal point

### *Non Timber Forest Products (NTFP)*

Species or products that originate in forest ecosystems and that are not timber

They also include destructive and non destructive extracts

### *Ecosystem products*

Products that are created by ecosystem function, all species in a given ecosystem contribute to these functions

### *Species products*

Products that originate from a single species

### *Reforestation*

Restoration of native forests Enrichment of degraded lands with native species

Encouragement of natural seral processes

### *Sustainability*

Sustainability is the ability to recover from perturbation and stress and is defined by both ecological and socio - economic criteria.

## *APPENDIX*

### **MEMBERS OF THE INTERNATIONAL ANALOG FORESTRY NETWORK**

**The Neo Synthesis Research Centre (NSRC), Sri Lanka** is a non-profit community organization with the status of a registered Non Government Organization (NGO) in Sri Lanka.

The major function of NSRC is to ensure sustainable agricultural production and conservation of biodiversity and the promotion of these goals. It does this through a variety of activities both at national and international levels. The primary activity of NSRC is research and education. It also conducts an active programme in the certification of Forest Garden Products (FGP's), publication of books, organization of seminars and workshops.

The membership of NSRC is open to the general public, where policy is set through meetings and consultations of its members. NSRC hopes to reverse the present trends in global forest loss and environmental degradation by education and by using the power of the marketplace to bring about land use changes to enhance biodiversity. It also seeks to improve the economic conditions of rural communities through the application of sound ecological land management. One area of activity towards this goal is the design of Analog Forests and the certification of Forest Garden Products.

**The Falls Brook Centre, Canada**

**Rainforest Rescue, Ecuador**

**Arbofilia, Costa Rica**

**COICAP, Peru**

Annexure 4.

NSRC CERTIFICATION for FOREST GARDEN PRODUCTS

Application Form for Producers.

1.Applicant's full name.  
.....

2.Postal address  
.....  
.....

3.Property location (if different from the above address).  
.....  
.....

4.Phone number.....Fax.....E-Mail.....

5.Total area farmed.  
.....

6.What area is to be covered by certification?  
.....

7.Have you applied for certification before?.....  
.....

8.Provide a brief description of the property with detailed map  
and a farm plan.....  
.....  
.....

9.What crops are certification sought for? What volume?

I.....  
.....

II.....  
.....

III.....  
.....

IV.....  
.....

V.....  
.....

10.What are the agricultural inputs such as fertilizers,  
pesticides and herbicides that have been used on the property?

- This year.....  
 .....  
 Last year.....  
 .....  
 The year before.....  
 .....  
 11.How are your crops harvested, processed and stored?  
 .....  
 .....  
 12.What kind of farm records do you keep?  
 .....  
 13.What machinery or equipment do you use?.....  
 .....  
 14.Do you irrigate any of your farm land?.....  
 15.Is there a mosquito control program in your area?.....  
 16.What is the land use around the farm boundaries?  
 .....  
 17.Are you practicing any erosion control methods? If yes, what  
 are they?.....  
 18.Do you protect your streams and stream vegetation? If yes, how?  
 .....  
 19. Map of land must be attached to this document.

I provide this information on the understanding it is confidential and will be used only by NSRC standards committee for purposes of this application.

Signed .....  
 ... .. Date......./...../ .....

Forward this application together with with Rs. . . . . to  
 The NeoSynthesis Research Centre  
 Certification Office  
 Belipola Estate  
 Mirahawatte

If you are accepted into the certification program the Forest Garden Products exported will be assessed at 2% of selling price

INSTRUCTIONS TO INSPECTORS

A Inspectors will be responsible to fill out a completed Application form from the applicant. Form number 1

B Inspectors will be responsible to fill out a completed Inspection form Form number 2

C Inspectors will need to collect a soil sample or samples depending on size of farm or if any contaminants are suspected This sample will need to be collected along 30 meter transects Every three meters a new small shovel of soil should be collected into a bucket and a mixed sampling of this soil needs to be saved and accurately marked This sample will accompany the above forms and be sent to the Certification Office

D Inspectors may collect tissue samples if they believe contaminants are present

When you go on a field visit be sure and bring  
Small bucket to collect soil samples in,  
Small hand shovel to gather soil samples,  
Bags to contain soil and/or tissue samples,  
Adhesive labels to mark sample bags

Annexure 6

NSRC Inspectors Form

Inspectors Name	Date	Farm #
1	Name of Owner	
2	Name of Farmer (if different from above)	
3	Length of time in residence	
4	Size of Farm                      Hectares	
5	Is farmer application from verified as correct? YES                      NO	If no why?
6	Dominant tree species	
7	Physiognomic Classification of Vegetation on A) Farmers' land	
B)	The nearest Natural forest	
8	Crop trees                      %                      Non crop trees	%
9	Epiphytes	
10	Vines and Lianas	
11	Ferns and Forbs	
12	Animals recorded	
13	Indicator species	
14	Special microhabitats	
15	Soil profile Horizons    A                      cm                      B                      cm                      C	cm
16	Erosion index    1                      2                      3                      4                      5	
17	Soil Management	
18	Water Sources	
19	Water quality	
20	Water treatments	
21	History of Management .....	
22	Fertiliser (inorganic) use    yes/ no    If yes, what quantity	
23	Biocides used on farm    yes/ no    If yes, what type and quantity	
24	Pesticides/rodenticides application at homestead    yes/no    If yes what type and quantity	
25	Is there any vector control program conducted here by the state	
26	Organic fertiliser sources, quantities applied	
27	Any animal husbandry    Yes/ no    If yes, describe	
28	Designing recommendations, A Planting	
B	Soil conservation, a contours, hedges	
b	mulching	
c	composting	
d	gullies and drains	
C	Water Conservation, a watershed habitat promotion	
b	filter ponds	
D	Pest/Pathogens biological controls	
29	Reinspection date	
30	Other remarks	

*Annexure 7*

Dear applicant,

Date

Thank you for applying to our Forest Garden Product certification program Your application has been approved by the certification committee Your farm has received the certified/transitional status If you are planning to export any certified products please contact the certification office for the individual product export form Your certification license number is\_\_\_\_\_

Sincerely,

Certification Office

145

*Annexure 8*

Dear applicant,

Date

Thank you for applying to the Forest Garden Product certification program. Your application has been rejected by the certification committee. The committee did not feel your land area will comply with our standards. You may appeal this decision if you feel there is a reasonable cause. Only written appeals will be considered. Please contact the certification office if you have any questions.

Sincerely,

Certification Office

14/6

SRI LANKA ORGANIC CERTIFICATION SERVICE  
&  
FOREST GARDEN PRODUCTS CERTIFICATION SERVICE  
OF  
**THE NEO SYNTHESIS RESEARCH CENTRE  
(GTE LTD.)**

*Hereby Certifies That*

*managed by*

meets the standards established for

**FOREST GARDEN PRODUCTS**

for the following operations

- 
- 
- 
- 
- 

This certification covers

.Acres and

Kgs

Certificate Number

Inspector

Standards Committee Chair

Re-inspection dates



**NSRC**

Farm Number: \_\_\_\_\_  
Date \_\_\_\_\_

This notice to the Certification Office from the Certification Committee is to

- Accept Farm as Certified
- Reject Farm as Certified
- Accept Farm as Certified Transitional
- Reject Farm as Certified Transitional

Remarks/Conditions

Date

Signature

EXPORT OF CERTIFIED FOREST GARDEN PRODUCTS

Date

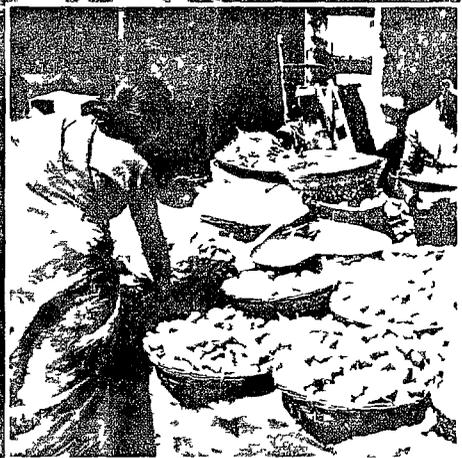
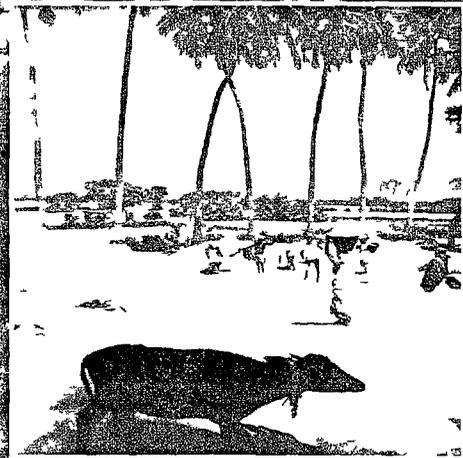
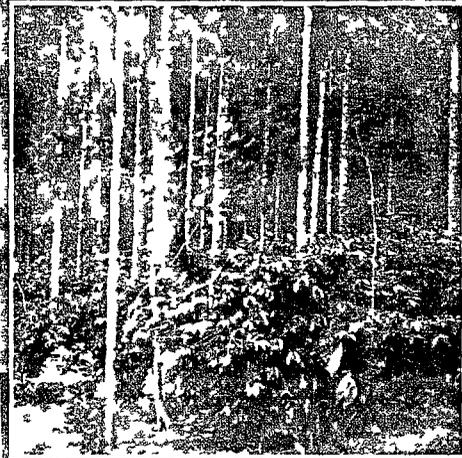
Farmer \_\_\_\_\_, who holds certification license number \_\_\_\_\_,  
is authorised to ship \_\_\_\_\_ kilograms of \_\_\_\_\_  
The total value of this shipment is \_\_\_\_\_ The assessed value is \_\_\_\_\_  
The assesment of 2% has been paid in full Thank you

# COUNTERPART INTERNATIONAL

# FOREST GARDEN PROGRAM

USING THE MARKET TO BENEFIT THE ENVIRONMENT AND PROMOTE POSITIVE SOCIAL CHANGE

AVAILA



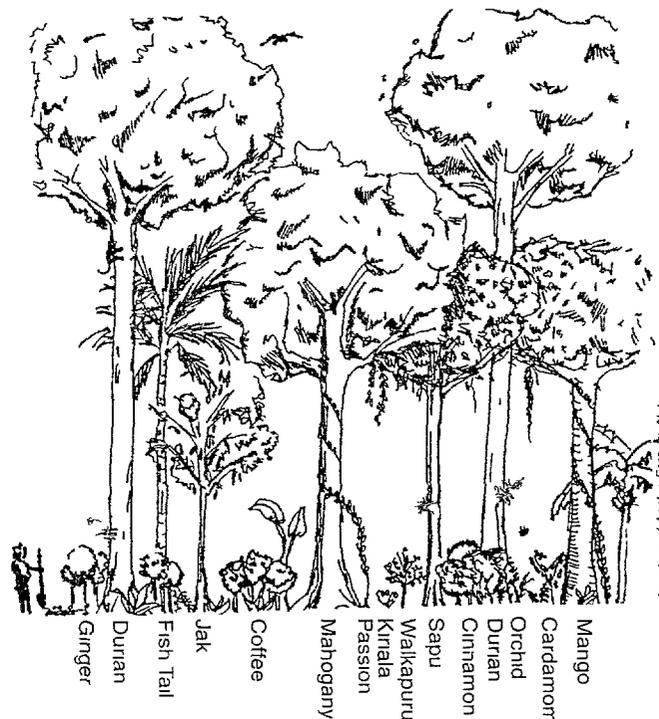
# FOREST GARDEN PROGRAM

**A Global Challenge** Throughout the world the environmental impacts of deforestation, large scale agriculture, and extractive industries continue to threaten natural environments and livelihoods. To combat this trend Counterpart International's *Forest Garden Program* restores degraded land through the integrated planting of a variety of woody crop producing trees and other plants following ecological principles proven to benefit the local environment while improving farmer productivity and income.

**Who We Are** Counterpart International was established in 1965 as the Foundation for the Peoples of the South Pacific. As a private, non profit, non governmental organization (NGO), Counterpart International works around the world with local partners to foster NGO capacity building, microenterprise, humanitarian assistance, food security and environmentally sound management of natural resources.

Counterpart's Division of Environment and Natural Resources has a special focus on restoration of human dominated environments. The Division's *Total Ecosystem Management* approach integrates participatory landscape management with appropriate indigenous systems of resource husbandry. This approach conducted in concert with awareness building on family health, nutrition, enterprise and the environment, improves people's quality of life and provides the impetus for sustainable local management of natural environments at risk.

**What is a Forest Garden?** A *Forest Garden* is a tree dominated plot with a mix of plant species that produce valuable foods and other natural products, such as nutmeg, mango, cashew, black pepper, coffee, ginger, tea, cardamom, and rattan. Composed of canopy trees, vines, understory shrubs, vegetables, and herbs, a mature *Forest*



A Forest Garden (Analog Forest)

*Garden* approximates a forest in structure and complexity. Planted to complement subsistence plots of rice or corn, rural farmers plant *forest gardens* because they generate the following useful products and benefits:

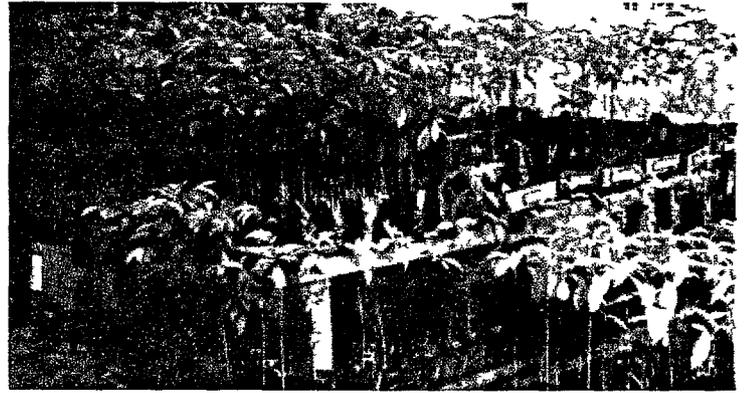
- ▼ Productive gardens of permanent utility crops— food, fuelwood, fodder, timber, and medicinal plants
- ▼ Improved individual incomes from cash crops
- ▼ Improved soil conditions
- ▼ Improved water and watershed management
- ▼ Heightened food security and family health
- ▼ Reduced pressure on adjacent forestland
- ▼ Restoration of native biodiversity
- ▼ Long term carbon storage which will counter global climate change
- ▼ Increased crop diversification

At the core of the *Forest Garden* initiative are the principles of *Analog Forestry*, a concept adapted from the traditional forest gardens of Southeast Asia. *Analog Forestry* has been perfected over a period of fifteen years by Dr. Raul Senanavake at the NeoSynthesis Research Centre in Sri Lanka. Dr. Senanavake now serves as the Regional Director of the *Forest Garden* initiative and scientific advisor to the program. His *Analog Forestry* method has been recognized as an important sustainable agriculture technology by an international panel convened by the United Nations Environment Program.



A sample of *Forest Garden* certified products from Sri Lanka.

Diverse seedling stock is critical to the Forest Garden Program



The *Forest Garden Program* fosters the introduction of sustainable farming through

- ▼ Training in farm planning and design
- ▼ Seedling nurseries and seed banks
- ▼ A seeds and-tools fund
- ▼ Technical assistance and training
- ▼ Companion educational materials
- ▼ Certification of *Forest Garden Products*
- ▼ *Forest Garden Product Marketing*

### In the Field with *Forest Gardens*

**Sri Lanka** On the-ground development of *Forest Gardens* in a range of Sri Lankan habitats serves as a stringent real world test of *Forest Garden* tenets under challenging environmental and social circumstances. The Sri Lanka program has produced measurable improvements in family income and biodiversity in more than twenty participating communities.

**The Philippines** This initiative centers on the island of Cebu, where the loss of forest cover has threatened soil and water resources. At the invitation of local upland agricultural communities, Counterpart International/Philippines is introducing *Forest Garden* principles to farmers' groups and cooperatives.

**Bosnia-Herzegovina** Counterpart International is in the process of bringing *Forest Garden* to a temperate zone nation where agricultural restoration is a high priority for postwar reconstruction. In Bosnia, *Forest Garden* methods will be adapted in a manner that will aid environmental restoration of war-zone areas and improve food security.

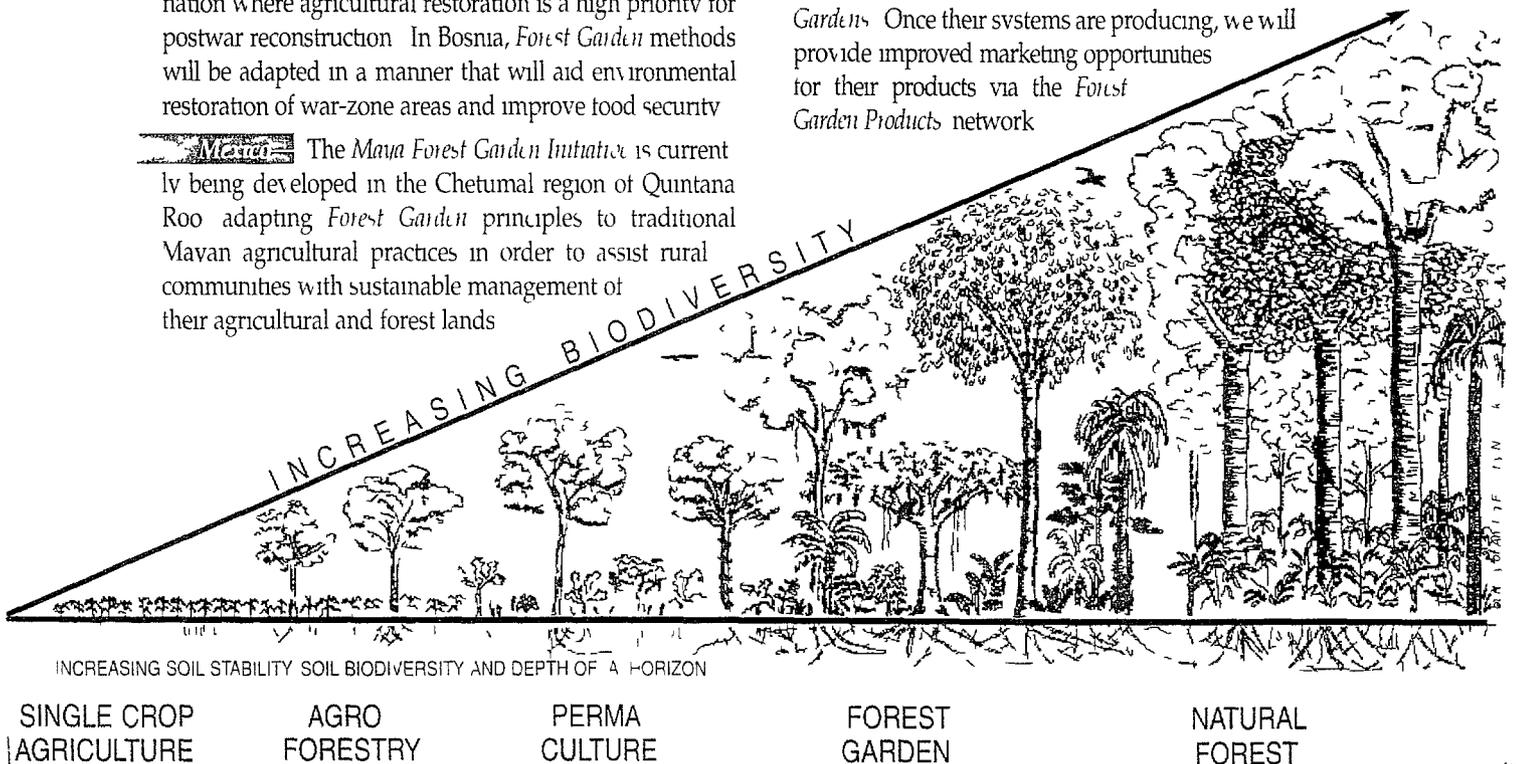
**Mexico** The *Maya Forest Garden Initiative* is currently being developed in the Chetumal region of Quintana Roo, adapting *Forest Garden* principles to traditional Mayan agricultural practices in order to assist rural communities with sustainable management of their agricultural and forest lands.

## Introducing *Forest Garden* to the World

The United States Agency for International Development is sponsoring our *Forest Garden* activities in Sri Lanka and the Philippines through a matching grant. Counterpart International plans to establish *Forest Garden* initiatives that replicate the successes achieved in Sri Lanka and the Philippines in other countries that will benefit from the system. The *International Analog Forestry Network* is taking the lead on these activities in Ecuador, Costa Rica, and Peru. With additional funding assistance from foundations, corporations, and government agencies, the *Forest Garden* concept can be developed into a tool for worldwide restoration of degraded agricultural land. We are actively seeking additional sponsors, institutional partners, and field collaborators to work in partnership to develop a worldwide *Forest Garden Program*.

## How Can You Help?

Counterpart International would like your support to make the *Forest Garden Program* grow. To accomplish this, Counterpart International will work with partner organizations in-country to develop local teams of trainers and outreach officers to provide awareness as well as the skills that will enable local farmers to initiate their own *Forest Gardens*. Once their systems are producing, we will provide improved marketing opportunities for their products via the *Forest Garden Products* network.



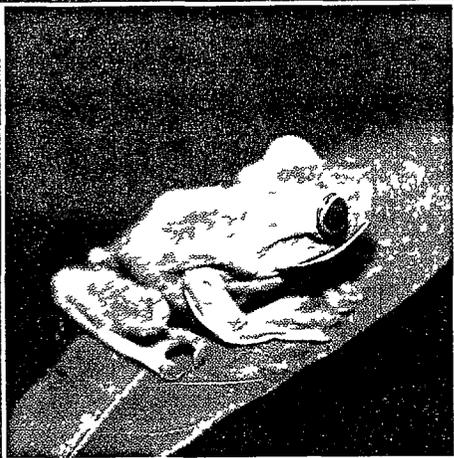
For more information about this unique program please visit our website at [www.forestgarden.org](http://www.forestgarden.org) or contact

**Dr Bruce M Beehler Director**  
Environment and Natural Resources  
Counterpart International Inc  
1200 18th St NW Suite 1100  
Washington DC 20036  
Tel 202-296-9676 Fax 202 296 9679  
Email [bbeehler@counterpart.org](mailto:bbeehler@counterpart.org)

**Mr Leonardo Chiu, Director**  
Counterpart International Inc / Philippines  
309 Junquera St Cebu City 6000  
Tel 63 32 254-0904 Fax 63 32 254 1040  
Email [lvchiu@durian.usc.edu.ph](mailto:lvchiu@durian.usc.edu.ph)

**Ms Kamal Melvani Director**  
NeoSynthesis Research Centre  
Belipola Estate Mirahawatte Sri Lanka  
Email [neosynth@sri.lanka.net](mailto:neosynth@sri.lanka.net)

**Dr Ranil Senanayke**  
**Regional and Scientific Director**  
Forest Garden Program  
Counterpart International Inc  
49 Upper Lake Rd Nuwara Eliya Sri Lanka  
Tel 94 2 522 481 Fax 94 1 692 007  
Email [100232.3435@compuserve.com](mailto:100232.3435@compuserve.com)



Produced with recycled paper and soy based inks

