

Progress Report

SECTION1- BACKGROUND INFORMATION

1.1 *Project Title:* People, Land Management and Environmental Change

1.2 *Project Number:* GF/1300-98-01

1.3 *Responsible Office:* The United Nations University

1.4 *Co-operating/Executing Institutions:* University of Ghana, Ghana; University of Conakry, Guinea; Kenya Agricultural Research Institute, Kenya; Ukiriguru Agricultural Research Institute, Tanzania; Makerere University, Uganda; Xishuangbanna Tropical Botanical Garden, China; National Research Institute, Papua New Guinea; IPAM (Instituto de Pesquisa Ambiental da Amazônia), Brazil.

1.5 *Reporting Period:* 1 March 2000 – 28 February 2001

SECTION 2 –PROJECT STATUS

2.1 *Status of the Implementation of the Activities and Outputs Listed under the Workplan in the Project Document*

2.1.1 *Status of the Implementation (check appropriate box)*

Project activities and outputs listed in the Workplan for the reporting period have been materially completed and the Institution reporting is satisfied that the project will be fully completed on time (given reasons for minor variations at Section 3 below)

Project activities and outputs listed in the Workplan for the reporting period have been altered (give reasons for alterations: lack of finance; lack of guideline; reformulated; project revisions; other at Section 3 below)

Project activities and outputs listed in the Workplan for the reporting period have not been fully completed and delays in project delivery are expected (give reasons for variations in Section 3.1 and new completion date in Section 3.2 below)

Insufficient detail provided in the Project Workplan

2.1.2 *Overall Progress Against the Project Workplan*

PLEC is now in the final year of the present four-year phase under GEF support. The project began its third year of implementation on 1 March 2000, and its progress is on schedule with some delays in reporting. Much of progress made from March 2000 to February 2001 focused on identification and demonstration of profitable and biodiversity-rich management systems, and on networking and capacity building. Dissemination of project results saw considerable progress. Gap filling and analysis of biodiversity and agrodiversity data continued.

Demonstration activities have now become the dominant field activity at 21 established demonstration sites in eight countries. Further demonstration sites are in development in response to popular demand from nearby communities. Rapid progress was made in the development of demonstration sites into fruitful places for farmer-to-farmer interaction, with the scientists playing a supporting role, and in the growing practice of bringing officials and other stakeholders into the farmers' meetings to demonstrate to them the success of PLEC approaches, which are being recognized and replicated elsewhere. Harmonization of demonstration approaches has basically been accomplished with STAT (Scientific and Technical Advisory Team) advice. Impact assessment of PLEC demonstration activities on farming practices have started.

PLEC continued to strengthen capacities of old or new participations in PLEC. Working with PLEC have helped more than 200 professional participants embrace a farmer-centred approach, learn research skills. Some of them participated in international exchanges. Students and junior researchers received training 'on the job' in the PLEC approach. Some of them did their degree theses based on PLEC work. PLEC concepts and approaches are incorporated into university curriculum. Demonstration activities facilitated farmer-to-farmer training on profitable methods of biodiversity-rich resource management. Training courses on practical techniques and knowledge, including literacy courses were also provided to participating farmers. Increased involvement of schoolteachers and children in PLEC demonstration helps to spread and sustain appreciation of local knowledge among new generation.

Good progress was made to assemble existing data into working databases at the national level for analysis, synthesis and monitoring in all participating countries with advice of a STAT member, especially after the PLEC database manual was made available in October 2000. Efforts were made to generate the aggregated information about those national databases and put into a meta-database, which will be online as soon as it is complete.

Much emphasis is now given to data analysis and consolidation following accumulation of raw data, and establishment of working databases. A PLEC-wide email forum was organized to exchange ideas on studying relationships between biodiversity and agrobiodiversity (management and organizational diversity) in middle of 2000. The data analysis is helping to improve and complete pending chapter-length reports, and to facilitate project dissemination.

Successful dissemination of emerging results has raised PLEC standing at both national and international levels, and PLEC methods and models are being replicated. PLEC in Brazil is widely recognised by government officials and others engaged in conservation and development. Several rural extension and conservation agencies are adopting PLEC's demonstration ideas as part of their development and conservation programs. In Tanzania, feedback meetings of initial results draw active involvement of the leadership at village, ward, division and district level in promoting PLEC, and making an impact far outside the demonstration sites. PLEC methods were applied in one of projects of National Knowledge Creation Program in China. The Second Meeting of PLEC Advisory Group complemented the unique contribution of PLEC to in-situ agrobiodiversity conservation at landscape level, and prompted PLEC, IPGRI and CBD to organize "International Symposium on Managing Biodiversity in Agricultural Systems". PLEC is now part of the CBD Liaison Group on Agricultural Biodiversity.

2.2 List Actual Project Personnel/Consultants engaged and Non-Expendable Equipment Purchased:

See Appendix 1 for List of Project Personnel/Consultants.

See Appendix 2 for List of Non-Expendable Equipment.

2.3 List Actual Activities and Outputs Achieved in the Reporting Period

2.3.1 FIELD-BASED ACTIVITIES: DEMONSTRATION SITES, BIODIVERSITY ASSESSMENT, PARTICIPATORY RURAL APPRAISAL and OUTREACH AND EXPERIMENTAL WORK

Much of the fieldwork on assessment of basic existing agrodiversity and biodiversity was completed although gap-filling and monitoring continued. Demonstration activities have become major field activities at 21 established demonstration sites. Further demonstration sites are in development in response to popular demand from nearby communities. Rapid progress was made in the development of demonstration sites into fruitful places for farmer-to-farmer interaction, with the scientists playing a supporting role, and in the growing practice of bringing officials and other stakeholders into the farmers' meetings to demonstrate to them the success of PLEC methods, which are being recognized and replicated elsewhere. Data analysis and consolidation were also advanced. Impact assessment of PLEC demonstration activities on farming practices have started.

Demonstration site

There was some over-optimistic expansion of demonstration sites in the first two years. This has had to be offset by closing down work in a few sites where there had been slow progress, or where the demands of doing good work greatly exceeded the limited resources. Where there has been real success, on the other hand, work is still being expanded into neighbouring or even remoter communities. Investigation of potential sites in which PLEC could be replicated has started. Selection criteria were proposed in Tanzania. A meeting of local authorities, farmers and researchers was organized specifically to identify these potential areas in Guinea. Specific locations of demonstrations and other PLEC activities as well as potential demonstration sites were mapped in Ghana. Site selection was largely completed in Brazil.

Agrodiversity assessment and database

Good progress was made to assemble existing data into working databases at the national level for analysis, synthesis and monitoring in all participating countries, especially after the PLEC database manual (database structure in MS Access program, and an operational manual, and a sample database) was made available in October 2000, and online in the PLEC homepage, and with advice of a STAT member. The aggregated information about those national databases and demonstration sites is still being generated. The information tables name, location, land formation,

cropping system, species richness, soil, land use of PLEC demonstration sites, and contact address and persons for further information. The aggregated information is then compiled into a meta-database for online publication. Methods of household agrobiodiversity assessment of PLEC-China were applied in one of projects of National Knowledge Creation Program in China.

Demonstration and outreach activities

Demonstration approaches among clusters were basically harmonized with advice of STAT (Scientific and Technical Advisory Team) and Scientific Coordinators though appreciation of existing "expert" farming could be further developed and enhanced. A major PLEC methodology paper on procedures and experiences of "expert farmers" led demonstration were published in PLEC News and Views, No.17. Careful monitoring of farmers' responses to demonstrated technologies received special attention in order to further test and develop the PLEC demonstration model. The number of people that participate in demonstration activities cannot be taken as a measure of the success. Information on the number of farmers that area adapting, rejecting or assimilating the technologies is required to assess the impact of demonstration activities.

AS PLEC demonstration models are being further improved, they are now being replicated by other projects or organizations. With success of demonstration activities by PLEC -Amazonia, several rural extension and conservation agencies are adopting PLEC's demonstration ideas as part of their development and conservation programs. PLEC in Tanzania were invited to assist the African Highlands Initiative (AHI) Project in getting the right farmers for the project. One PLEC member in Guinea is now coordinating the PGRN (Natural Resources Management Project) with application of PLEC approaches.

Initial success of on-farm "expert farmers" led demonstrations in Tanzania attracted the leadership at village, ward, division and district level to promote PLEC work and encourage more farmers to attend on-farm training sessions, and to extend widely training by video presentation. PLEC is widely known in and outside demonstration sites. PLEC scientists also helped farmers to search germplasm of potential crops and restore disappearing crops. In Guinea, expansion and success of the PLEC gardener groups in food production using compost draw supports from the World Food Program.

Some important demonstration events included a field day at Tumam, PNG, October, field days of the 5th WAPLEC workshop, October in Ghana, and an international demonstration activity in Iquitos, Peru in November that brought farmers from all the Amazonian sites, including that in Peru.

Data analysis and consolidation

Following accumulation of raw data, and establishment of working databases, much emphasis is now given to data analysis and consolidation. A PLEC-wide email forum was organized to exchange ideas on studying relationships between biodiversity and agrodiversity (management and organizational diversity) in middle of 2000. The data analysis is helping to improve and complete pending chapter-length reports. Baseline data analysis shows that agriculture, or other forms of management of natural resources, does not necessarily reduce biodiversity. On the contrary, it may enhance biodiversity and improve land quality. Experiment and innovation by farmers continues to be a key to cope with changes in natural, social and economic landscapes. As part of a strategy to

increase their incomes in the face of falling agricultural prices, for instance, farmers in the Amazon floodplain near Macapa, Brazil, are protecting the seedlings of timber species to enrich their future fallows and forests.

Some preliminary analysis of the information on farmers' use of demonstrated techniques during and after demonstration activities were collected and stored in the database by PLEC- Amazonia help answer some critical questions for developing PLEC demonstration models. For example, how do expert farmers exchange their technical knowledge with other farmers? It was found expert farmers primarily exchange their knowledge with people to whom they are closely related. When the expert farmer is empowered (which is mainly through interaction with PLEC members) he/she is then able to exchange with other people from outside the communities. Experts tend to exchange only particular technologies and they tend to keep secret the ways they sell their products. Experiences and knowledge learned and built through demonstration activities will continue to be analysed by all clusters. A report in this respect is underway.

2.3.2 ACTIVITY 5: REPORTS, WORKSHOPS ON MODELS

Gap filling continued to consolidate, improve and complete pending chapter-length reports at national and cluster levels. Some of them were selected to put into recent issues of "PLEC News and Views". Considerable efforts were made notably in Ghana to ensure completion of chapter-length reports on schedule. However, some of chapter-length reports are delayed, including those required in 2000 contract. A discussion on this issue is attached in following sections.

2.2.6 ACTIVITY 6: CAPACITY STRENGTHENING (TRAINING)

PLEC continued to strengthen capacities of old or new participations in PLEC. Working with PLEC has helped more than 200 professional participants embrace a farmer-centred approach to sustainable development, and learn research skills. Some of them participated in international exchanges. They include many local officials and technicians. Students and junior researchers received training 'on the job' in the PLEC approach to rural development with conservation. Some of them did their degree theses based on PLEC work. The following table lists number of students still working with PLEC in Brazil, China, Uganda and Ghana. PLEC concepts and approaches were incorporated or proposed into university curriculum at Makerere University and University of Ghana. These efforts on curriculum development will greatly increase number of university students and young researchers appreciating and applying PLEC models.

	# Students finished their theses			# Students started their theses		
	Undergraduate	Masters	PhD	Undergraduate	Masters	PhD
Brazil	10	3	3	5	4	2
China					5	
Uganda				1	3	
Ghana					8	

A large number of farmers, our main partners, and other participants in PLEC were also benefited. Demonstration activities facilitate farmer-to-farmer training on profitable methods of biodiversity-rich resource management. PLEC models of demonstration are proving effective to diffuse locally developed knowledge as well as germplasm within and between demo sites. There is increased number of farmers interested in participating in on-farm farmer to farmer exchange of knowledge and practices. Video presentations and organization of farmers' groups were used to accommodate the popular demand. Video presentations have also helped disseminate expert farmers' technologies to local officials, technicians and remote farmers, who may have less chance to join the on-farm demonstrations. PLEC Farmer Associations in southern Ghana have matured to be able to organize demonstrations independently of the scientists. Training courses on practical techniques and knowledge, including literacy courses were also provided to participating farmers. 26 women farmers in Pita, Guinea have learned the literacy under the PLEC course.

Increased involvement of schoolteachers and children in PLEC demonstration helps to spread and sustain PLEC concepts, especially appreciation of local knowledge among young generation. Having participated in demonstration activities, the school children in Arumeru, Tanzania were newly appreciative of their parents' expertise in agricultural production, something they did not believe in before. A positive development was the formation of a 'Junior Secondary School PLEC Youth Association' in a northern Ghana site. Various training courses were provided to rural students and teachers in Brazil.

2.2.7 ACTIVITY 7: NETWORKING AND DISSEMINATION

Successful dissemination of emerging results has raised PLEC standing at both national and international levels. PLEC in Brazil is widely recognised by government officials and others engaged in conservation and development. Several rural extension and conservation agencies are adopting PLEC's demonstration ideas as part of their development and conservation programs. In Tanzania, feedback meetings of initial results draw active involvement of the leadership at village, ward, division and district level in promoting PLEC, and making an impact far outside the demonstration sites. PLEC methods were applied in one of projects of National Knowledge Creation Program in China. The Second Meeting of PLEC Advisory Group complemented the unique contribution of PLEC to in-situ agrobiodiversity conservation at landscape level, and prompted PLEC, IPGRI and CBD to organize "International Symposium on Managing Biodiversity in Agricultural Systems". PLEC is now part of the CBD Liaison Group on Agricultural Biodiversity.

Presentations and conferences of project-wide significance on dissemination include:

- "Agrodiversity as a means of sustaining small scale dryland farming systems in Tanzania" presented by F. Kaihura at the 15th Session of Global Biodiversity Forum, Nairobi, 12-14 May 2000.
- "Agricultural Biodiversity Potential in East Africa: Global Significance, Prospects and Threats" by J. Tumuhairwe at the special session on GEF projects in east Africa on 19 May, during COP5/CBD in Nairobi.

- "Local Markets and Local Forest Managers in Amazonia" by Miguel Pinedo-Vasquez at the UNU International Conference on Forests and Sustainable Development - The Values of Forests, Tokyo, 12 and 13 October 2000.
- "Field Assessment of Land Degradation from the Perspective of the Land User" presented by M. Stocking at the 11th International Soil Conservation Conference, Buenos Aires, 22-27 October 2000.
- C. Padoch invited to represent PLEC at CBD Liaison Group Meeting on Agricultural Biodiversity, Rome, and 24-26 Jan 2001.
- "Managing land so that it does not degrade: lessons from some modern thinking in science and research" presented by H. Brookfield at the Workshop on Regeneration Ecology and Management for Degraded Landscapes and Forest Ecosystems, Chiang Mai University, 10-16 February 2001.
- H. Brookfield represented PLEC at Regional Science/Policy Conference on Global Change and Sustainable Development in Southeast Asia, Chiang Mai, Thailand, 17 - 19 February 2001.

Major project-wide publications include:

- PLEC News and Views, No.15, 16 and 17 published and online.
- PLEC Agrodiversity Database Manual online in October 2000.
- The working paper Land Degradation - Guidelines for Field Assessment is online in November 2000, and now widely referenced. It was funded by other UNEP funds. A poster on the paper was also displayed at UNCCD/COP4, Bonn, 11 to 22 December 2000.
- "Biodiversity conservation through agrodiversity: PLEC midterm report" in UNU Work in Progress, Volume 16, Number 2, Spring 2001 (<http://www.unu.edu/hq/ginfo/wip/wip-spr2001.pdf>).
- As one of principal outputs, the proposal for a PLEC book on "Cultivating Biodiversity: The Meaning, Analysis and Use of Agrodiversity " was favourably reviewed by ITDG Publishing in London.

Three important meetings were organized:

- The 3rd General Meeting, the 4th Meeting of the Management Group, and the Coordination Team Meeting were held back to back in Belem and Macapa, Brazil, from 26 May to 2 June.
- 2nd Meeting of PLEC Advisory Group was hosted by FAO Rural Development Division, Rome 3 November 2000 to solicit advice from relevant UN agencies, CG system and NGOs. The meeting was chaired by UNU Vice Rector, and attended by 17 participants from FAO, IFAD, IPGRI, ICARDA, IUCN, ETC/ILEIA (Centre for Information on Low-External-Input and Sustainable Agriculture), and TSBF as well as UNU, UNEP and PLEC. The meeting complimented the unique contribution of PLEC to the *in-situ* agrobiodiversity conservation at landscape level, and made a few important recommendations (see ACTIVITY 8).
- The 5th WAPLEC Regional Workshop brought together over 70 international PLEC scientists, farmers, government- and non-government officials for fruitful deliberations on the theme, '*Farmers, Scientists and Government Agents: Partners in search of*

Sustainable Conservation Methods' during October 2001 in Ghana. It was widely acclaimed as successful.

Many efforts to disseminate PLEC successful results were made in participating countries. See country summaries under Section 4.

Details of meetings, publications and conference presentation are included in Appendix 3.

2.2.8 ACTIVITY 8: COORDINATION AND PLANNING

Project implementation is monitored internally by UNU, and externally by UNEP. PLEC coordination facilitated the mid-term review of PLEC in April 2000. The review report praised the project for having made important progress on the theme of "agricultural diversity" in only two GEF-funded years. It also praised the "lean central administration" at UNU and the effective management unit at the cross-country level. It called for more efforts to consolidate PLEC results and to move into a more analytical stage. A project-wide email forum on potential ways of sustaining PLEC activities after the present phase has been organized and will continue.

Part of coordinators met in Rome after the 2nd Meeting of PLEC Advisory Group. In response to the meeting recommendations, follow-up meetings with responsible personnel from IPGRI, and then from CBD were made to propose joint organization of International Symposium on Managing Biodiversity in Agricultural Ecosystems in Montreal, Canada, November 8-10, 2001. The Advisory Group also linked PLEC with the FAO Inter-Departmental Working Group on Biological Diversity for Food and Agriculture, whose chair proposed that PLEC participate in the CBD Liaison Group Meeting on Agricultural Biodiversity. Linkage with the GEF Biodiversity Planning Support Programme (BPSP) was also established to disseminate PLEC results. Two case studies of Ghana and China have been selected for the Environment Liaison Centre International (ELCI) project on Managing Agricultural Resources for Biodiversity Conservation under the GEF/BPSP.

After appointment of Dr. R. Kiome as the Director of the Kenya Agricultural Research Institute (KARI), he has less time for coordination of East Africa Cluster. It was then decided that Dr. Kiome be appointed Regional Advisor for East Africa and Leader for Kenya sub-cluster within PLEC. Group leaders within Kenya will also take on more responsibilities.

Coordination with and within clusters continued. The Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, now hosts China Cluster due to relocation of personnel.

2.3 Targets for the Next year

Overall targets for the next period of work in relation to the annual work plan and outcomes of the previous period of work are described under each of 8 activities.

Activity 1: Demonstration sites

Continue work at established sites, and expand to nearby places as appropriate and demanded.

Using field and GIS methods as appropriate complete investigation of potential sites in which PLEC methodology might be replicated. At discretion report separately on this aspect (Report 11), but in any case include discussion in the final report 12 described below.

Activity 2- biodiversity, agrodiversity and agro-biodiversity

Not later than 31 August 2001, complete any gaps, including follow-up monitoring of selected sites, and entering of data in the standardized database form at cluster level.

Complete a project-wide meta-database and put it online as soon as most clusters submit aggregated information.

Activity 3: Participatory rural appraisal (organizational aspects)

Complete any remaining gaps in work on the social analysis of demonstration-site populations. Ensure that aspects in the Guidelines (including gender roles and resource tenure) are covered in a comparable manner for all sites.

Activity 4: Outreach and experimental work

Continue and expand monitoring and experimental work already initiated, in collaboration with selected expert farmers.

Hold community-level workshops to review results. Involve other stakeholders and officials at discretion. Review in collaboration with farmers the benefits they have received from PLEC, and benefits they might like to receive in any follow-up work. Report on this should be included in progress report to UNU, and be discussed in the final report (below).

Activity 5: Data analysis, reports, workshops on models

Cluster is to undertake data analysis to test the PLEC-wide proposition that biodiversity is positively correlated with good management. Supply as soon as possible any delayed chapter-length reports. Organize a national meeting with officials from collaborating government agencies, NGOs and other organizations, at which the final technical and policy recommendations are presented and discussed. These recommendations should be formally written up for national use, and sent to UNU as soon as available (Report 9).

Well in advance, cluster should begin work on a final general report described below (Report 12). This report should include summary descriptions of all demonstration site areas and a short history of PLEC work from the time of its inception, and an internal assessment of the practical and research achievement of the cluster. This report (with or without its annexes) should be delivered by 28 February 2002 and not later.

Cluster reports will be then consolidated as final reports of PLEC by coordination team with STAT assistance.

Activity 6: Capacity strengthening (training)

Continue established capacity building programme, especially, graduate student training in PLEC work.

Attach a final summary statement on progress in the capacity building programme, with quantitative data on number, status and gender of persons trained, to the end-of-year report in February 2002. Attach this as a separate report (Report 11).

Activity 7: Networking and Dissemination

UNU/PLEC is to organize 1) the 5th Meeting of PLEC Management Group, Arusha, Tanzania, 2-6 May 2001; 2) in collaboration with IPGRI and CBD on International Symposium on Managing Biodiversity in Agricultural Ecosystems in Montreal, Canada, November 8-10, 2001; 3) PLEC General Meeting, tentatively in New York, April 2002.

UNU/PLEC is to continue proposed publications of a book, and a special issue of journal, and to prepare the final report for possible publication. To select and award best PLEC papers.

Every cluster is to organize a national meeting separately, or in conjunction with a cluster meeting at which the final technical and policy recommendations are presented and discussed with relevant government agencies, NGOs and academic institutions. There will be opportunity to bid for funds to finance the meeting in July-August. This bid needs to accompany an early mid-year progress report.

Activity 8: Coordination

Coordination team will meet separately in Arusha, Tanzania during the 5th Meeting of PLEC Management Group to plan the conclusion of the present phase and the future PLEC. Coordinators will participate in national meetings of PLEC as appropriate, and will facilitate the final evaluation of PLEC.

Cluster is to plan forward into the post-PLEC period well before the end of the year.

SECTION 3 – PROJECT DELIVERY AND ACTION

3.1 Summary of the Problems Encountered in Project Delivery (if any)

There generally was inadequate consolidation and integration of available information at cluster level for required chapter-length reports and database although basic data and information have been collected at initial stage. The mid-term reviewer also highlighted this problem.

Delays in submission of chapter-length reports by clusters have become an issue although most cluster activities continue on schedule. PLEC members have found the fairly heavy programme of reporting set out in the Project Document to be burdensome. And this has been particularly so for the leaders. Especially since all are part time, they find writing reports takes them away from the real work of PLEC in the field, because report writing has to be done in their offices.

The year 2000 also saw some personnel changes, such as promotions, moving to better positions, or unfortunate death of a few key members in Africa. These changes disturbed the work to some extent, especially slowed reporting. There had been a serious delay of reporting by two Clusters. Fund disbursement to both of them had been postponed as a result.

3.2 Actions taken or required to solve the Problems (identified in Section 3.1 above)

Much emphasis is now given to data analysis and consolidation following accumulation of raw data, and establishment of working databases and to improve and complete pending chapter-length reports. A PLEC-wide email forum was organized to exchange ideas on studying relationships between biodiversity and agrodiversity (management and organizational diversity) in middle of 2000. Practical guidelines for database compilation were also developed. More guidance for principal reports will be provided to clusters in the near future. Although above efforts do improve reporting, there is a need to integrate some of the fairly heavy programme of reporting so that limited human resources could concentrate on final synthesis reporting.

More staff time and personnel are required for expanding PLEC work. Some clusters recruit student assistants to help reporting. It was also recommended that cluster leadership delegate more responsibilities to other fellow members or obtain institutional support so that they can concentrate their time on reporting to ensure timely submission of all required reports.

PLEC is under institutional arrangements with host institutions of clusters. The in-kind support from the host institutions need to be strengthened to back up cluster leadership in planning, implementation, especially reporting of PLEC project activities.

SECTION 4- SUMMARY OF CLUSTER PROGRESS

Amazonia Cluster

PLEC-Amazonia had made considerable advances in the implementation of demonstration, training and research activities in the year 2000. During this year, the Amazonia cluster hosted PLEC's General Meeting,

demonstration work expanded beyond the influence areas of the three PLEC sites: Amapá, Santarém and Marajo. In addition, the team managed to make considerable advances collecting data on agrodiversity and other production and management technologies as well as conservation practices and organising data in the PLEC database. Most of the reported data are organized in tables, diagrams and charts.

Results of project activities during 2000 have greatly increased the recognition of PLEC-Amazonia's activities by government officials and others engaged in conservation and development. Several rural extension and conservation agencies are adopting PLEC's demonstration ideas as part of their development and conservation programs. These agencies and other institutions have requested the assistance of PLEC-Amazonia members in the process of designing and planning their training and research activities. The Amazonia PLEC team has used this advisory role to disseminate the results of their demonstration and research activities and to make policy recommendations on how to protect biodiversity while enhancing household incomes in rural Amazonia.

Establishment of demonstration sites.

At three sites of Macapá, Santarém and Marajo, the selection of landholdings and the establishment of demonstration plots and transects in agriculture, agroforestry and forest areas was completed. While permanent demonstration plots were established in agroforestry and forest areas, most plots established in agricultural fields were temporary and used for demonstrating the production techniques applied to annual and semi-annual crops. The following lists demonstration plots:

	Macapá		Santarém		Marajo	
	# plots	# lndhldngs	# plots	# lndhldngs	#	# lndhldngs
Agriculture fields (plots)	32	15	6	6		3
Managed fallows (plots)	27	12				
Unmanaged fallows (plots)	24	9				
Managed forests	25	10	2	2		1
Unmanaged forests	18	8				
House gardens	28	12	6	3		1

Demonstration activities.

Most of the demonstration activities planned for year 2000 were executed. An increase in the number of participants for demonstration activities was experienced this year in relation to 1999.

	2000		1999	
	# activities	Av. partic.	# activities	Av. partic.
Extended family gatherings	21	18	24	7
Labour sharing groups	110	12	86	9
Village or inter-village demonstration sessions	42	52	14	22
Regional/sector demonstration sessions	12	42	3	27
Regional/sector demonstration sessions for technicians & students	15	21	3	13
International demonstration sessions	1	25	0	0

An international demonstration activity took place in Iquitos in November 2000. The information on farmers' use of demonstrated techniques during and after demonstration activities are also collected and stored in the database. These data will be analysed in 2001. Some preliminary results of the data analysis provides very important information that helps to answer the following critical questions:

- a) How do expert farmers exchange their technical knowledge with other farmers? Information collected during and after demonstration activities suggests the following: First, expert farmers primarily exchange their knowledge with people to whom they are closely related. When the expert farmer is empowered (which is

mainly through interaction with PLEC members) he/she is then able to exchange with other people from outside the communities. Experts tend to exchange only particular technologies and they tend to keep secret the ways they sell their products.

- b) What do participant farmers expect from the expert farmers? Most participant farmers expect to learn the specific technologies that the expert farmers demonstrate as well as to find out whether they can expect some economic gains. A simple affirmative answer to the profit question is usually enough, because most participant farmers know that expert farmers will never discuss their financial dealings in any detail.
- c) What are the attitudes of the participant farmers in relation to the role of expert farmers as instructors? The majority of participant farmers respect expert farmers as knowledgeable people and are motivated to participate in demonstration activities where farmers are instructors. Participant farmers found the farmer-instructors to be not only knowledgeable, but also people with whom they could readily discuss their production and management technologies and the problems that they confront.

Training Activities

Several training courses were conducted for farmers, students, technicians, and rural teachers. The instructors were invited researchers or technicians working in the region as well as members of the PLEC team. The training courses included visits to demonstration plots established in the fields, fallows and forests. The following lists subjects, number of training courses and their average number of participants.

	#	Avg. Partic.
Training courses for farmers:		
1) Establishment and monitoring of lake and forest reserves	14	32
2) Environmental education	15	24
3) Processing and store of fruits, grains and animal products	12	28
Training courses for students from rural schools:		
1) Agricultural systems and techniques	9	26
2) Agroforestry systems and techniques	6	18
3) Forest management systems and techniques	10	16
4) Environmental education	4	33

Training courses for technicians:		
1) Agricultural systems and techniques	6	18
2) Agroforestry systems and techniques	11	14
3) Forest management systems and techniques	8	16
4) Establishment and monitoring lake and forest reserves	5	15
5) Environmental education	16	13
Training courses for rural teachers:		
1) Environmental education	15	23
2) Processing and store of fruits, grains and animal products	3	12

The following materials were produced (written in Portuguese) from the training courses and demonstration activities:

1) Training courses: Four technical pamphlets on how to establish and monitor lake and forest reserves Six manuals for environmental education applied to varzea environments Three pamphlets on how to process and store fruits, grains and animal products Two manuals on how to establish and monitor lake and forest reserves

One manual on environmental legislation.
2) Demonstration Activities: Two manuals on how to control banana disease Three manuals on agroforestry systems and techniques applied to fallows Two manuals on forest management systems and techniques for fallows and forests

PLEC-Amazonia continued training local and international graduate and undergraduate students. The following students finished or began their training and their research thesis under the supervision of PLEC-Amazonia researchers:

	# students finished their theses			# students starting their theses		
	undergraduate	Masters	PhD	undergraduate PhD	Masters	
Macapá	4	2	3	3	3	2
Santarém	6	1	0	2		
Marajo					1	

Research Activities

Activities of the year 3 focused on: agrobiodiversity and other biodiversity surveys; household surveys that collect agrobiodiversity, production and management technologies, conservation practices, and household income; socio-economic surveys of the communities; and market surveys in the cities and communities.

PLEC-Amazonia continued to collect considerable data on the diversity of agricultural, agroforestry and forest species and varieties that smallholders plant, manage and conserve in their agricultural fields, fallows, house gardens and forests. Data collected in the surveys were organized in the database. The following summarizes the number of agrobiodiversity and biodiversity surveys conducted at each site during the year 2000.

	Macapá				Santarém*				Marajo*			
	Flds.	Fallws.	Hgrds.	Frsts.	Flds.	Fallws.	Hgrds.	Frsts.	Flds.	Fllws.	Hgrds.	Frsts.
# surveys	44	36	58	16	45	22						
T. area surveyed (ha)	38	52	44	112	7.4							
Avg. # species per ha	26	78	22	84	35							
Avg. # varieties per ha	69	92	48	0								

* Data not yet fully summarized in the form needed for this table.

Household surveys have shown that smallholders use a great diversity of production and management techniques and systems. Data collected on household income is being processed. The following summarizes the number of household surveyed and some results:

	# surveyed households	# Agricultural techniques. systems		# Agroforestry techniques. systems		# forest management techniques. systems	
Macapá	115	64	16	42	18	28	9
Santarém	45						
Marajo							

The processing and analysis of the socio-economic and market data collected during the surveys was not completed. In Macapá and Santarém the majority of households in the communities were surveyed. Surveys of the markets of Santana, Macapá and Santarém continue.

The long-term research activities continued in the year 3. In addition, the team continue measuring some ecological parameters that can be used as indicators for agrobiodiversity and biodiversity levels in the landholdings of smallholders. Specific studies to test locally developed agricultural and agroforestry techniques as well as forest management are underway. For details, read their report.

China Cluster

Most of activities have been conducted, and necessary data have been collected and preliminarily analysed.

Demonstration Sites and Outreach and experimental work

Expert farmer led demonstration approach has been accepted and implemented after the visit of scientific coordinator and DAT as one of success models in sustainable community development and agrobiodiversity conservation in China. Extension and experimentation on cash-earning activities still exist as demanded by the local villagers. HH/ABA and farmers evaluation in 1999 helped select 181 households for demonstration and experimentation. Among those households are 26 expert farmers, and 155 experimentation farmers. Demonstration activities have been extended to 265 households with a total area of 1510 *mu*, (15 *mu* = 1 hectare) and also extended to some other communities near demonstration sites.

- Xishuangbanna: 17 households were identified as expert farmers for demonstration (12 in Daka, 5 in Baka). 155 households continued experimentation activities in a total area of 236 *mu*, including homegardens, fuel woodlots, agroforestation, silviculture and butterfly breeding etc. and extended to 65 households (45 households on fuel-saving stove, 20 on butterfly). Farmer to farmer visit between 2 ethnicity groups continued.
- Gaoligongshan: 9 households were selected for homegardens, agroforestry, fuelwood and silviculture demonstration in Baihualing village. Their demonstrations have been monitored and assessed in 2000. More than 100 families have learned techniques and are benefited. Extension area is 1510 *mu* and 13,000 seedlings have produced. Farmers Association on Biodiversity Conservation of Gaoligongshan has organised community workshop to exchange experiences between 9 demonstration households and non-demonstration households (50 participants).

Biodiversity Assessment

Survey on 87 sampling plots of 14 land use stages in 4 demonstration sites was conducted for agrobiodiversity assessment according to BAG guidelines and HH-ABA. An HH-ABA database has been developed. These methods become important and hot research on rural development and natural resources management in China. In 2000, the HH-ABA has been more widely applied to agrobiodiversity demonstration, agroforestry systems, forests management and land use. HH-ABA has been published fully in Chinese on *Acta Botanica Yunnanica* XII and briefly in English on PLEC N&V No.16.

- Xishuangbanna: 58 sampling plots of 7 land-use stages (3 years fallow, paddy, fuel woodlots, community forests, holly forests, conservation forests and agroforestry) have been investigated (20 in Baka, 38 in Daka), and preliminarily analyzed. Parts of field data have been compiled into HH/ABA database.
- Gaoligongshan: 39 sampling plots of 7 land use stages have been surveyed (28 of 5 land use stages in Shabadi, 11 of 2 land use stages in Baihualing). Demonstration households have also been assessed for monitoring by using of HH/ABA in 2000.

Participatory rural appraisal

According to PLEC guidelines and HH/ABA methods, socio-economic appraisal of 202 households has been conducted. These data have been and will be important first-hand data to understanding the interrelationship between socio-economic changes and agrobiodiversity changes, as well as monitoring social-economic change of those households, biodiversity management, land utilization, and agrobiodiversity development and conservation.

- Xishuangbanna: Social-economic survey of 66 households has been conducted in Xishuangbanna, accounting for 60% households of each community, i.e. 30 households in Daka, and 36 in Baka in 2000.

- Gaoligongshan: Family social-economic survey of 135 households in Gaoligongshan has been conducted, including 55 in Baihualing, and 80 in Shabadi respectively.

Field activities can be summarized in the following table.

Items	Quantity	Remarks
Socio-economic appraisal	201 households	
Agrobiodiversity survey	Sampling plots	
Demonstration and experimentation	265 households	
Expert farmers	26 farmers	
Community demo farmer to non-demo farmer workshops	2 times with 86 farmers in total	
Expert farmer workshops.	2 times with 30 farmers in total	

Reports, Workshops on Models

As part of workplan, two reports of Xishuangbanna and Gaoligongshan were completed for mid-term review.

Capacity Strengthening

Capacity building was a major activity in 2000 to strengthen extension and dissemination. 5 master degree students (one registered in XTBG and 4 jointly with Yunnan University) started fieldwork. 86 farmers joined 2 community workshops on demo farmer to non-demo farmer. 30 farmers joined 2 “expert farmer” workshops. 66 farmers joined 2 training courses on practical techniques and agrobiodiversity conservation. 4 training courses organized for young researchers and local officials on human ecology, agrobiodiversity assessment and conservation. Most young researchers are familiar with PLEC concept and approaches through PLEC fieldwork. Farmers Association on Biodiversity Conservation continued to organize the farmer-to-farmer visit. Details are as follows:

- Young researcher and official training courses
 1. April 9, 30 researchers attended the Seminar on “Genes on the Farm field” by the midterm reviewer in Xishuangbanna.
 2. 20-26th July 2000, 23 participants joined “Methodology of Human Ecology and Agrobiodiversity” in Xishuangbanna by scientific coordinator, cluster leader and STAT member.
 3. 12-14th August 2000, cluster leader gave a lecture on “Biodiversity Management and Conservation” at the Yunnan Provincial Environmental Officials Training Seminar attended by 45 officials from 37 prefectures of Yunnan Province.
 4. 8-9th September 2000, cluster leader gave a lecture on “Agrobiodiversity Assessment and Conservation” at the XTBG Graduate Students Training course attended by 20 participants.
- Community workshops and farmers training
 - 31 December 2000, a village exchange activity for the new century ceremony in XTBG, attended by 47 farmers from Daka and Baka villages.
 - October, 2000, field-training course on homegarden in Daka, joined by 12 demonstration farmers and 12 non demonstration farmers
 - December, farmer training workshops on agrobiodiversity conservation and practical techniques in Daka and Baka, attended by 36 farmers.
 - 2 demonstration farmer workshops were organized by Farmer Association of Biodiversity Conservation in Baihualing. In attendance were researchers, local officials, village heads and 30 farmers.
 - 1 community field workshop among demo farmers and non-demo farmers, attended by 50 farmers in Baihualing.
 - 29th December, 1 farmer’s training course on “Rural Applied Techniques and Fruit Tree Plantation and Management” organized in Baihualing and 5 training materials printed and disseminated.

Networking and Dissemination

China cluster members attended 4 national and provincial meetings and symposiums to present HH-ABA and PLEC:

- June 2000, HH-ABA was applied in the project of ecosystem restoration and construction of Mingjiang River, one of the projects of National Knowledge Creation Program.
- 21-22nd August 2000, “Agrobiodiversity and Biological Industry Development” presented at “Xishuangbanna Prefecture Biological Industry Development Conference”.
- 1-3rd December 2000, 3 PLEC papers presented at Annual Meeting of Yunnan Association of Ecology.
- 2-3rd January 2001, 8 members presented PLEC at “Workshop on Social-economical Development and Biodiversity Conservation in Xishuangbanna” sponsored by UNESCO and organized by XTBG.

News media reported China cluster progress twice:

- May 2000, *an example of fuelwood plantation and fuel-save stove* in Xishuangbanna Newspaper by Mr. Zenrong.
- October 2000, China Central Broadcasting Yunnan director reported demonstration sites in Xishuangbanna.

Publications are listed below. Cluster newsletters were distributed among cluster members, government official etc.

Items	Quantity	Remarks
China Cluster Newsletters	6 issues	
News in press	2 times	
Papers	13	
Book	1 (Flora of Gaoligongshan Mountains)	
Special issue of Acta Botanica Yunnanica	1	

Coordination and Planning

The new China Cluster office was set up in Kunming Branch of XTBG in March 2000, transferred from Kunming Branch of CAS. Two sub-cluster leaders have been appointed as deputies of the China cluster. Project meetings and visits organised as follows:

Items	Quantity	Remarks
China cluster working group meeting	1 with 9 participants in total	
China Cluster Annual Meeting	1 with 27 participants in total	
Domestic visitors	5 times	
International visitors	3 times	Midterm review, DAT visit, and coordination visit

PNG Cluster

Field activities

Ogotana Demonstration Site:

- Establishment of nursery and bulking of biodiverse seedlings for the rehabilitation demonstration
- Established grassland rehabilitation demonstration
- Partial analysis of biodiversity assessment for selected land use stages (fallow types)
- Completed community forest nursery.
- Field visit by Scientific Coordination Team (Brookfield and Kanok), invited stakeholder representatives and PLEC PNG Cluster Staff
- Trained two undergraduate students from the Agriculture Department, University of Technology

Tumam/Nghambole Demonstration Site:

- Agrodiversity assessment for second year garden (Yekene) – 50 gardens (30 Tumam and 20 Nghambole)
- Hunting survey (3 hunters)
- Dietary survey (16 families – 8 from Tumam and 8 from Nghambole)
- Market survey (6 families – 3 from Tumam and 3 from Nghambole)
- Monitoring of management practices of 12 farmers

Reports, Workshops on Models

- One-day Symposium, 9 October 2000, Wewak, and field visit to Tumam/Nghambole on 11 October 2000 by PLEC regional advisor, and invited stakeholder representatives from government, university, and NGO.

Networking and Dissemination

Conference presentations:

- "Progress report on research and demonstration activities in Ogotana" presented at the Sirinumu Development Company Meeting in Port Moresby, Papua New Guinea.
- "Sustainability of shifting cultivation and sago production systems" to be presented at the International Sago Symposium, 26-28 June 2001. Port Moresby.
- "Sustainable resource management and food security" presented at the Food and Nutrition Conference. University of Technology, Lae, 2000.
- "Recent research in the use of wildlife in Papua New Guinea" presented at the Food and Nutrition Conference. University of Technology, Lae, 2000.
- "Planning for sustainable resource management" presented at the Regional Planning Workshop, Smugglers Inn, Madang, 2000.
- "Demonstrating the value of biodiversity conservation in Ogotana Village Central Province", Poster displayed at the one day PLEC PNG Cluster Symposium. Wewak. 9 October 2000.

Publications/reports:

- Sowe, J.W. and Umba, R. (Unpublished). Biodiversity assessment in Ogotana Village, Sogeri Plateau, Central Province, Papua New Guinea. Internal Report. National Research Institute.
- Sowe, J.W. and Boboro, D. (Unpublished). Agrodiversity assessment in Ogotana Village, Sogeri Plateau, Central Province, Papua New Guinea. Internal Report. National Research Institute.
- Allen, B.J. and Sowe, J.W. (2000). Activities at the PLEC site at Tumam Village, East Sepik Province, Papua New Guinea, August 1999 to October 2000. PLEC Views and News. Research School of Pacific and Asian Studies, Division of Society and Environment. The Australian National University. PP34-39

Radio Broadcast:

- Sowe, J.W., Tokomeyeh, C. Moris, B. and Liru, E. (2000). Radio Didiman' program for the United Nations University project on People, Land Management and Environmental Change (UNU-PLEC) in Tumam and Nghambole Villages, Drekkir, East Sepik Province, Papua New Guinea. Radio East Sepik, National Broadcasting Commission. December 2000.

Coordination and Planning

Coordination and planning maintained at the National Research Institute while financial responsibilities at the Australian National University until the PNG Kina improves.

PLEC-Uganda Sub-cluster

Drastic progress was made especially in the field based activities and updating the database. Fifteen farmer-led demonstrations of good practices were conducted with PLEC scientists as facilitators and recorders. Collaborations with farmer groups continued, and some groups have started to formalise their associations. Farmer experimentation gains a more scientific approach with additional farmers as replicates. Promising technologies being developed include the different agroforestry systems locally existing on very few innovator farms, and the new greatly challenging system of integrating zero grazing livestock into crop production.

Networking and dissemination has been satisfactory and the visibility of PLEC impact in Uganda is promisingly good. Involved policymakers seem to be quite fascinated by the PLEC approach. The green light to reach its vision of "Developing Bushwere into a model parish for agrobiodiversity conservation and good land resource management" is beginning to show

Demonstration Sites

PLEC Scientists facilitated about fifteen demonstration activities, based on nine expert farmers and their innovative practices. Each farmer handled a group of 20 - 30 participants with 1 - 3 PLEC Scientists as facilitators and recorders. In some cases, farmers tried out lessons learnt on the host's field and shared knowledge and experiences in smaller groups on different farms. Six more demonstrations are planned for next year.

Four of these involved 20 PLEC farmers visiting three expert farmers and one farmers' organisation outside Bushwere demonstration site since PLEC farmers asked to visit elsewhere to share experiences and add to their knowledge and options. The three expert farmer demonstrated on the following:

1. Small scale tree and vegetable nursery management as well as selection of trees and shrubs for boundary planting.
2. Transformation of small resource poor farmers into small but resourceful and food sufficient commercial farmers.
3. The visit to Uganda National Farmers Association exposed the PLEC farmers to improved crop management, and to see sources of appropriate farm inputs as well as learn about benefits of formal farmer organisations.

Biodiversity Assessment

The counting of plant species in the plots was repeated during both minor and major growing seasons of the year 2000. Gaps in agrobiodiversity tree data and changes in resource access and management were filled and all data put in the database according to BAG and Coffey guidelines. The fields with bananas were re-inventoried to distinguish varieties and their different uses. Farmers prefer to grow certain varieties in certain locations in relation to homestead or wind direction or edge. Consultations were then made with taxonomists in INIBAP to group the recorded varieties into known clone sets and respective scientific classifications.

Participatory Rural Appraisal

Monitoring of the systems of resource access and distribution and how these relate to the use of land continued. A report is being prepared. Resource access in Bushwere is very dynamic as some farmers especially the young and the resource poor borrow or hire land on seasonal basis from the older or bigger land owners. Others buy and sell gardens for various reasons. Husbands own the land as well as all perennial and wives do not own land but have access to it particularly for growing crops for domestic use. Female-headed households are exceptions.

Outreach and Experimental Work

A few experiments continued. 1) Different ways of managing *Setaria* grass that was introduced by USCAPP for stabilising the soil bands; 2) Simple methods of reverting the soil fertility gradient on sloping field; 3) Handling and preparing Irish potato seed for improved timeliness of planting. One of the treatments involve using an indigenous herb (*Crassocephalum* Sp) to speed up sprouting; 4) Storage methods of Irish potatoes for market and home to enable farmers to time good market prices and ensure food security by minimising losses.

Reports, Workshops on Models

A field workshop was held in the demonstration site for PLEC farmers and Scientists to further sensitise Policy makers, local leaders and other farmers about PLEC concepts, goals and activities as well as involving them in Agrobiodiversity conservation activities. Participants were about 750, 500 adults, 52% of which were women. Policy makers were 29 in total including district level administrators and technical advisors, as well as Sub-county and Parish level political and administrative leaders.

The cluster also hosted a technical workshop on 'Land Degradation field Assessment techniques' prepared by Professor Michael Stocking with assistance of his co-author of the "Land Degradation - Guidelines for Field Assessment", Ms. Niamh Murnaghan. This was sponsored by DFID and the participants were 20, representatives of training and research institutions, government departments, policy making and governing bodies and field extension workers. This workshop was a response to a request by Uganda Cluster to fill a technical gap noted in most clusters for guidelines in field assessment of land degradation.

Report 6 and report (7) are being prepared.

Capacity Strengthening

Continued to involve students as trainers. There are one full time (male) and two part time (female) graduate students, and one certificate level student (male) who are resident in Bushwere to assist in monitoring on a contract basis.

PLEC concept was incorporated into the "Land Productivity Assessment and Reclamation" course taught by the sub-cluster leader. As part of the course, a group of 12 students (6 males and 6 females) visited a small-scale model farmer with biodiversity-rich livestock - crop-farming system on a land that was initially marginal for agricultural use.

Efforts were made to ensure that all members are familiar with PLEC approach and the manner in which it differs from standard extension methods. This was done through regular planning meetings, field workshops and demonstrations.

Local farmers received training as well. Two artisans trained on design and construction. Two literate farmers trained to monitor and assist other farmers to keep input-output records of one selected farm enterprises. Participating farmers were assisted to encourage others in use of successful methods through field days.

Networking and Dissemination

Networking was sustained with relevant stakeholders through interaction in several meetings, workshops, and conferences, and through consultation and borrowing literature, especially those working on biodiversity, land management, environment and agriculture, banana research and farmer innovation.

Policymakers are often invited to officiate at PLEC workshops or other PLEC related functions where PLEC members are involved.

The following papers were presented to relevant conferences and are submitted for publication.

1. "Agricultural Biodiversity Potential in East Africa: Global significance, Prospects and Threats" presented at the COP 5 to CBD in Nairobi 15 - 26 May 2000.
2. 'Agricultural Biodiversity in East Africa: the PLEC Approach to its Conservation' presented at 18th SSSEA (Soil Science Society of East Africa) Conference in Mombasa, November 2000.

One paper was prepared for prepared for PLEC NEWS and VIEWS Vol. 18. Three papers are included in Proceedings of 17th SSSEA Conference.

Coordination and Planning

Cluster co-ordination went well over the year with few problems. Personnel change, including death of a key member affected the work progress. There is increasing collaboration with Mbarara University staff (2 members) to provide regular support to field staff.

Tanzania Sub Cluster

PLEC presence in two demonstration sites and outside are expanding after initial success of on-farm demonstration. PLEC farmers are over 100 in each site and about 30 school children from one primary school from either site. Recent mission to Arusha by a PLEC/STAT member confirmed that PLEC is widely known in and outside PLEC sites. This is partly due to increased number of farmers interested in participating in on-farm farmer to farmer exchange of knowledge and practices and partly due to a decision by the leadership in respective sites to cover more farmers using videotapes from previous on-farm demonstrations.

PLEC farmers are reorganized into different village groups to accommodate more farmers and expand the activities. Diverse community/groups initiated activities for rehabilitation and conservation of degraded lands/land use types. Women are empowered through free and increased active participation in projects, meetings and workshops as a breakthrough towards addressing actual practitioners of land resources management at farm level.

To restore disappearing crops, farmers were assisted to attend Farmers Day organized by Ukiriguru Agricultural Research Institute, and identify potential crops for introduction. PLEC farmers are also arranged to join the African Highlands Initiative Project (AHI) workshop.

In line with this success, feedback meetings attracted active involvement of the leadership at village, ward, division and district level in promoting PLEC work and encouraging more farmers to attend on-farm training sessions and join diverse agrodiversity enhancement groups. Draft policy recommendations were also formulated. Some recommendations are already being implemented at village level.

Demonstration Sites

Potential sites for PLEC replication are proposed to be: 1) in similar AEZ of current PLEC sites in Kiserian and Olgilai/Ng'iresi; 2) where agrodiversity is declining, e.g. semi-arid environments, over populated areas (livestock and humans), and; 3) where farmers and the leadership at all levels promise cooperation and active participation. Specific sites are to be located this year.

In order to facilitate greater participation of farmers both sites were subdivided into two. Each group appointed the chair, secretary and treasurer, and developed a specific plan of activities at community/village level. Within villages smaller groups including school children have been formed to address different aspects of agrodiversity enhancement and conservation but also aimed at increasing their food supply and income. The groups include and get moral support from the village's leadership, schoolteachers and religious leaders.

Biodiversity and Agrodiversity assessment

PLEC-Tanzania database was developed and maintained. Gap filling, data compilation and analysis and draft reporting on biodiversity assessment have been completed. The draft report was currently being refined for submission to coordinators. The sampled fields and quadrates were remarked.

Outreach and Experimental work

Demonstration is carried out in the form of on-farm farmer-to-farmer discussions and field day. Farmers from outside PLEC sites also attended, and requested PLEC involvement in their villages. In two cases school children and their teachers in agriculture were invited to attend. Those children were amazed on how much their parents knew about agricultural production, something they did not believe in before. They requested to participate in the future demonstrations. The initial success of demonstrations prompted the village and district leaders to request such activities be intensified and extended to cover all farmers inside and outside PLEC sites. Using videos of previous demonstrations, training sessions were conducted for farmers who never attended on-farm farmer-to-farmer discussions. A summary is presented in the table below.

	Olgilai/Ngiresi	Kiserian	Average participants
On-farm demonstration	7	5	30
Field day		3	?
Video training	1	1	?

More farmers at individual, group and community levels have initiated and some have expanded projects on income generation and increased biodiversity at farm level. Some introduced the energy-saving stoves that decrease the high demand for fuelwood. The number of farmers keeping beehives and number of beehives per family is gradually increasing as a strategy for protecting woodlots from fires and grazing but also earning money by selling honey. Some farmers originally keeping chicken alone have now diversified to include rabbits, pigs and goats. Some farmers claim that they are able to buy school uniforms for their children using money generated from agrodiversity enhancing and income earning activities. These activities have also made it possible for some farmers to pay levy in time. Seeing PLEC experiences of income generating activities, some youths have joined PLEC and have decided to invest in intensive agricultural production especially with vegetables instead of going to towns in search for jobs of unskilled labour.

Farmers have stressed the need to make a list of indigenous trees with potentials to be used in agroforestry, timber production, conservation of catchments, forestry etc, and document their ecological and economic values for future generations. The lack of literature about indigenous trees resulted in their replacement with trees from outside by NGOs. The same applies to pasture grasses.

Participation of two farmers in Farmers Day organised by Ukiriguru Agricultural Research Institute. Farmers identified some semi-arid crop varieties for introduction in Kiserian and increase the diversity of drought tolerant crops within their site. This is a follow up to a decision made by them at the workshop to restore disappearing crops previously grown in Kiserian. Ukiriguru conducts research on semi-arid crops including those of their interest.

Reports, Workshops on models

Several policies and few technical recommendations have been developed through feedback and workshop deliberations between farmers, extension staff, other NGOs in Arumeru and research staff. Report 7 was submitted. Report 6 will be compiled and completed in the first half year of 2001.

Two feedback meetings and two workshops conducted to give feedback to farmers on PLEC progress and findings. The last workshop "Strategies for involvement of stakeholders in agrodiversity conservation", 25-26 Jan 2001 involved wide stakeholders, including relevant government agencies at national, district, regional levels, and several NGOs, district councillors, leaders of women farmer groups outside PLEC. Previous on-farm farmer to farmer exchange of experiences videos were used to show to workshop participants what is going on in the field and to emphasize the PLEC approach of empowering farmers to manage their own things with little support from professionals. It was at these meetings that a decision was made to expose all farmers to PLEC work, and plans made to show the videos to extended farmer and technical audiences.

Capacity strengthening (Training)

- One student from University of East Anglia UK is currently working on gender and agrodiversity in Arumeru.

- Participating farmers and other stakeholders including school teachers and religious leaders have joined hands to promote PLEC activities by ensuring a greater participation in training sessions and actual practice at their farms.
- The use of taped videos in feedback meetings and workshops was an appropriate tool to demonstrate PLEC activities and methodology to diverse stakeholders and land users in Arumeru. It was also unanimously accepted as an approach that many other stakeholders should emulate.
- Two extension staff were trained in facilitating PLEC farmer to farmer exchange of experiences on-farm to be able to continue video training programmes in their respective villages.

Dissemination and networking

- “Agrodiversity as a means of sustaining small scale dryland farming systems in Tanzania” well received at the 15th Session of Global Biodiversity Forum, 12-14 May 2000.
- Both end of the year sub-cluster meeting and forward planning conducted.
- Stakeholder's involvement went further than meetings to field activities. PLEC activities in Tanzania presented at national and zonal annual research review meetings.
- PLEC farmers participated in African Highlands Initiative (AHI) Project workshop. The scientist was invited to assist AHI in getting the right farmers for the project.
- Two of the NGOs sent their project evaluation missions to PLEC. The regional and district offices are now frequently sending most of their visitors to PLEC farmers. The respective district councillors are currently working in close collaboration with PLEC due to observed success and farmer's interests to continue PLEC work.
- 1 paper in PLEC News and Views, 16.

Ghana Subcluster

Foundations for sustained PLEC work were consolidated. Key factors involved are:

- Emergence of a cadre of expert farmers who are eager to serve as demonstration and extension agents;
- Accelerated government interest;
- Integration of a large number of enthusiastic school children and their teachers; and,
- Use of video for sensitisation and demonstrations

The most significant development was the demonstrated ability of expert-farmers to demonstrate techniques and methods of conservation and the PLEC ideal independently of the scientists. This plus a growth in farmer capacity to generate income and other forms of additional value from conservation has positive implications for sustained growth and development of PLEC in Ghana.

Demonstration Sites

Expert-farmer-led demonstrations in southern Ghana continued successfully, involving school children and their teachers as well as extension agents. A positive development was the formation of a ‘Junior Secondary School PLEC Youth Association’ in a northern Ghana site. In central Ghana female-managed projects continued. Exchange of seeds and seedlings as well as knowledge accelerated within and between demonstration sites. Relevant agents at district-level were involved in the demonstrations. Addition of value to conservation helped enhance rural livelihoods, such as apiculture within conserved forests, and developing group and individually owned plant nurseries into commercial ventures.

Specific locations of present as well as potential demonstration sites were mapped.

Biodiversity Assessment

Gap filling in data collection and compilation continued. Future fieldwork might have to be more selective in terms of geographical focus due to inaccessibility. Agrodiversity assessment proceeded satisfactorily. Investigation of evaluation of resources by communities relative to evaluation by scientists was carried out. Reports are attached.

Participatory rural appraisal (organizational aspects)

Data collection for social analysis of population and how these relate to resource tenure and management continued. Personnel changes slowed the progress of gap filling in southern Ghana. Substantial information on resource access relative to land use was gathered in central and southern Ghana.

Outreach and experimental work

A group of women farmers in Manga-Bawku site, northern Ghana conducted on-farm trials to compare indigenous rice varieties and improved varieties. Preliminary results show two indigenous rice varieties have high yield potential and compare well with improved varieties. They also have unique properties that make them preferred by the women farmers.

Community-level workshops and other forms of meeting numbered more than 80 were to sensitize farmers to the PLEC ideal of conserving biotic resources within agriculture drawing on local knowledge of conservation, and to demonstrate methods of conservation.

School children, government agents and non-governmental agents (notably, Ghana Rural Reconstruction Movement) as well as farmers were involved. Television coverage excites popular interest as does video shows, which have the added advantage of being a very effective medium of demonstration. Also PLEC stands could be enhanced by critical farmer evaluation of the PLEC work.

Reports, Workshops on models

Content of pending principal reports are embodied in papers presented at the Kumasi Technical Working Session.

Capacity Strengthening

Eight graduate students were involved in PLEC work, mostly as research assistants. They numbered six in southern Ghana and one each in central and northern Ghana. Undergraduate students were involved as well. The draft of a course that draws on the PLEC approach to resource conservation is ready for possible introduction within 2001/2002 in the University of Ghana. At the same time a search continues for funding for the envisaged University of Ghana-based CARPLEC, Centre for Applied Research on People, Land Management and Environmental Change.

Through the PLEC Farmer Associations, farmers were now able to conduct demonstrations independently of the scientists. This shows that the Farmer Associations are becoming self-sustaining in terms of human capacity for conservation promotion. In northern Ghana there were PLEC-sponsored training sessions for farmers in mango grafting and cotton spinning and weaving.

No opportunity was lost at workshops and other such fora to further explain the purpose and novel approach of PLEC to conservation and development. Even so, there remains much education to be carried out, as the stereotyped orthodox 'top-down' conceptions of research and development is still prevalent in certain quarters including even scientific ones.

Networking and Dissemination

For networking between Ghana and Guinea, the 5th WAPLEC Regional Workshop brought together over 70 international PLEC scientists, farmers, government- and non-government officials for fruitful deliberations on the theme, *'Farmers, Scientists and Government Agents: Partners in search of Sustainable Conservation*

Methods' during October 2001 in Ghana. It was widely acclaimed as successful. Two Ghanaian for a collaborative fieldwork made a visit to Guinea.

Within Ghana, PLEC-Ghana Technical Working session brought Ghana PLEC scientists together for discussions of work progress at Kumasi in February 2001.

On publicity, a 25-minute video documentary of northern Ghana PLEC activities and a 30-minute one showing PLEC activities in southern Ghana were produced. It has proved popular, particularly among school children at forae organized to demonstrate PLEC. In development is a documentary focussed mainly on demonstration activities. Publications by members include 4 papers on yam types, gender and agrodiversity, trees that combine well with field crops, and in-situ conservation of indigenous rice in *PLEC News and Views* 15, and 17.

Coordination and Planning

The PLEC office located in the University of Ghana continued to serve as the principal co-ordinating node for PLEC work in Ghana and West Africa as a whole. Subsidiary PLEC offices operated at the Kwame Nkrumah University of Science and Technology (KNUST) in central Ghana and at the University for Development Studies (UDS) in northern Ghana. PLEC work was also facilitated by UNU/INRA, whose Director, participated in PLEC meetings and other activities including the 5th WAPLEC Regional Workshop.

Guinea Subcluster

The annual workplan was successfully implemented in most of the demonstration sites despite some delays in the beginning. Many feedback meetings manifested active participation of farmers as well as local authorities interest in the continuation of the PLEC activities. These meetings expanded PLEC links with new farmers' groups in other villages. Contacts with farmers and local authorities were also intensified. Local elected officials (District Presidents, Sector Heads) were involved in project activities.

Demonstration site

Work focused on two existing demonstration sites in Pita (Bantignel) and in Kouroussa (Moussaya), with some extension to other small villages nearby. A meeting between local authorities, farmers and researchers took place in Pita to identify potential replication of some activities in other villages where sustainable infrastructure and operational groups exist.

Pita site:

Farmers' groups in gardening, composting, reforestation, dyeing and soap making have organized productive activities in both dry and rainy seasons. Dyeing and soap making involve sustainable use of many local plant species (e.g. *Lonchocarpus cyanescens*, *Indigofera tinctoria*, *Morinda gemminata* for dyeing; *Jatropha curcas*, *Carapa procera* for soap). As a result, farmers can work all the year around. Most male labourers have gone to big cities, leaving women, children and old people in villages. Women are the major forces in PLEC farmers' groups. Techniques of gardening and composting were extended to nearby villages such as Labaya village. Activities of dyeing, soap making, reforestation and agroforestry were also extended.

The gardening group concentrated its efforts on cultivation of potatoes, groundnuts, onion, fonio (also acha in Nigeria = *Digitaria exilis*), and niebé (or niebe with two acute accents on the 'e's, is one of the terms for cowpea, until recently *Vigna unguiculata* now often *Vigna sinensis*). The World Food Program (WFP) awarded 15 tons of rice and a fund of 3.900.000 GF to PLEC groups in recognition of their organized efforts for food security. PLEC is now widely known.

Expert farmers promoted compost techniques in PLEC villages and nearby. Wide use of the compost ensured food production as high as that in the Middle Guinea. PLEC farmers have made 18 composts since 1998. The mineral fertilizers were also used to supplement organic ones. Land can be now utilized through the year by crop rotation.

Sustainable management is widely understood and accepted. The nursery provided seedlings of many very useful local, introduced or endangered species for reforestation and agroforestry in degraded areas, water

sources, along the tapades (fenced fields) and other suitable areas. Expert farmers developed reliable agroforestry systems to control bush fire. The reforestation with coffee is encouraged by USAID.

The dyer women group was reorganized in 3 sub-groups in order to increase monthly production. The group is among the most dynamic women groups in the Foote Dalton. The soap making has now expanded to other villages. The income of soap sale is encouraging.

The data of agro-biodiversity were compiled into a database in Access, recording 254 species. The GIS of Missidé Héiré village is established. A soil study was done in Pita to assess needs of fertilizer according to the type of crops. The compost was also analysed. The demographic data including rural-urban migration were collected.

Kouroussa (Moussaya) site:

The fieldwork was managed by a newly established PLEC team at Kansan University. Farmers, craftsman and fishermen groups have been organized.

Biodiversity inventory continued. 4 plots were marked in different groves of *Uapaca topoensis* and in the tapades.

Socio-economic surveys concerning village history, main tribal groups, land management and use types, and household conditions have been done. The surveys showed that most households are short of food. To achieve food security, gardening methods should be promoted so that food can be also produced during the dry season.

Activities in gardening, handicrafts and bee keeping were developed to generate incomes from sustainable use of biodiversity. The profitable apiculture is promoted while other economic activities are difficult in dry season.

A study on the role of beliefs in maintaining biodiversity started. The research on wild life and hunting activities has started in order to identify endangered species and propose management strategies. The authorities of the Haut Niger National Park are highly interested in it.

Reports, workshop on models

A national workshop was organized at Pita. In attendance were 15 scientists, 10 government representatives (from many departments of rural development) 5 NGO agents (from Pita Prefecture) and 20 farmers from Pita and Kouroussa (Moussaya) respectively. PLEC methodology and approaches were recognized as good not only for the demonstration sites but also for the rest of whole country. PLEC results achieved on the ground at both sites Pita and Kouroussa were requested to disseminate throughout the country and a continuation of PLEC recommended.

Capacity building (Training)

A training workshop was organized in Kouroussa for a newly established team of researchers at University of Kankan. This workshop enabled them to be in charge of fieldwork in Kouroussa. Training of young researchers and students in PLEC guidelines in agrodiversity and agrobiodiversity continued. One senior member attended an English training course with partial support from PLEC.

PLEC continued to support field activities of farmers and groups with materials and organization. The literacy training courses have enabled 26 women farmers to read and write. 7 women from nearby villages were trained in dyeing. Women in Dar-Es-Salam were trained in soap making by a retired specialist. Gardening activities were extended to a few more villages. Two farmers trained in gardening techniques at the Bareng Agricultural Research Centre. Two dyer women participated in the workshop organized by the PRIDE, an American NGO.

Most of the Pita farmer's groups consist of women (more than 90% sometimes). PLEC support these women in diversifying their activities in gardening, cultivation in the external fields, dyeing, crafts, soap making, et al.

Networking and dissemination

The net workings continue to involve many stockholders: ministries, NGO (national and international), farmers groups within and out of PLEC network. Two researchers from Conakry visited Kankan group to assess the accomplished work and to make the workplan for the future. A new cooperation between PLEC and Bareng agricultural research centre started to train farmers on practical techniques of gardening. One PLEC member is now coordinating the PGRN (Natural Resources Management Project) with application of PLEC approaches

Two researchers from Ghana visited Guinea for a comparative study between the demonstration sites of Guinea and Ghana. Three peoples participated to the Regional Waplec Workshop in Ghana that was held in October 2000.

The Labé and Kankan rural broadcasting stations reported PLEC.

Coordination and planning

The coordination is managed by the cluster leader who analyses all suggestions for application according to the terms of reference. He is assisted by a deputy in charge of planning.

