

P.N. AcB-960

96418



MALAWI AGROFORESTRY EXTENSION PROJECT



Trip Report and Recommendations

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January 1998

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Master Reference List of MAFEP Acronyms and Abbreviations – Dec. 1997

ACB	Agricultural Communications Branch (MOA&I)
ACDI	Agricultural Cooperative Development International
ADMARC	Agriculture Development and Marketing Corporation
ADD	Agricultural Development Division (8)
AF	Agroforestry
AHI	Animal Health and Industry (MOALD)
AOB	Any Other Business
ARET	Agricultural Research and Extension Trust (estate sector)
AS	Agroforestry Secretariat (of NASC)
ASAP	Agricultural Sector Assistance Program (USAID)
ASC	Agricultural Sciences Committee (under MOREA)
ASP	Agricultural Services Project (World Bank)
BAT	British Association of Tobacco, Limited
CADC	Catchment Area Development Committee
CBM&E	Community-Based Monitoring and Evaluation
CBNRM	Community-Based Natural Resource Management (NATURE sub-project)
CMU	Coordination and Management Unit (MAFE)
CPAR	Canadian Physicians for Aid and Relief
CSC	Christian Services Committee
CU	Concern Universal
CURE	Coordination Unit for Rehabilitation of the Environment
DAET	Department of Agricultural Extension and Training
DAHI	Department of Animal Health and Industry
DARTS	Department of Agricultural Research and Technical Services (MOALD)
DDC	District Development Committee
EPA	Extension Planning Area
ESP	Environmental Support Program (World Bank)
EU	European Union
ELDP	Evangelical Lutheran Development Programme (NGO)
FA	Field Assistants
FD	Forestry Department
FES	Forestry Extension Services
FRIM	Forestry Research Institute of Malawi
GIS	Geographic Information Systems
GOM	Government of Malawi
ICRAF	International Center for Research on Agroforestry
IEF	International Eye Foundation
LMC	Lutheran Mobile Clinics
LRCB	Land Resources and Conservation Branch (MOA&I)
LRT	Lilongwe Round Table
M&E	Monitoring and Evaluation
MAFE(P)	Malawi Agroforestry Extension Project
MEM	Ministry of Energy and Mines
MEMP	Malawi Environmental Monitoring Project (U. of Arizona/Clark University - NATURE)
MEP&D	Ministry of Economic Planning and Development
MFF&EA	Ministry of Forestry, Fisheries & Environmental Affairs

MNR	Ministry of Natural Resources
MOA&I	Ministry of Agriculture & Irrigation (formerly MOALD)
MOALD	(former) Ministry of Agriculture and Livestock Development
MOF	Ministry of Finance
MOREA	(former) Ministry of Research and Environmental Affairs
MPT	Multi-purpose Trees
MTEF	Medium-term Expenditure Framework (see PBBS)
NARS	National Agricultural Research
NASC	National Agroforestry Steering Committee
NATURE	Natural Resource Management and Environmental Support Program (USAID)
NGO	Non-governmental Organization
NHBG	National Herbarium and Botanical Gardens
NPA	Non-Project Assistance
NRC	Natural Resources College
NTSC	National Tree Seed Centre (FRIM)
PA	Project Assistance
PAPPPA	Poverty Alleviation Programme Pilot Project Agroforestry (EU) (formerly ADDFOOD, now PROSCARP)
PBBS	Performance Based Budgeting System
PM	Program Managers (ADD)
PS	Principal Secretary
PVO	Private Voluntary Organization
PROSCARP	Promotion of Soil Conservation & Agricultural Rural Production (EU, formerly PAPPPA)
RDP	Rural Development Programme
RT	Reduced Tillage
SADC	Southern Africa Development Community (formerly the Southern African Development Co-ordination Conference - SADCC)
SADP	Smallholder Agribusiness Development Project (ACDI)
SC	Soil Conservation
SO	Strategic Objective - One-Five in USAID Malawi - MAFE is in SO2, natural resources/ NATURE)
TEAM	Tobacco Export Association of Malawi
TOR	Terms of Reference
UNDP	United Nations Development Programme
UNIMA	University of Malawi
WB	World Bank
WSM	Wildlife Society of Malawi
WSU	Washington State University
WVI	World Vision International (NGO)

Executive Summary

The authors made an on-site visit to MAFEP from 1 December to 18 December, 1997 to: a) review the MAFE project with particular emphasis on monitoring and evaluation (M&E) and assess the agroforestry extension program under development and implementation; and b) work with the Strategic Objective 2 (SO2) team (USAID, University of Arizona, Government of Malawi and other partners) on the overall NATURE strategy and planning.

Despite efforts of the Government of Malawi (GOM), donors and others, natural resource degradation has continued to accelerate. Contributing factors include expansion of burley tobacco production, legal and regulatory frameworks in transition, and limited training and support to help users adopt improved technologies and practices. The situation is critical, and key stakeholders are intensifying their efforts to address it. Shortening the time from problem identification to adoption of feasible solutions should comprise the core of USAID and GOM strategies.

The USAID Natural Resource Management and Environmental Support Program (NATURE) is a US\$40 million dollar program which is helping to address this issue through non-project assistance and a portfolio of small technical support areas or projects. These focus on policy reform, environmental monitoring and evaluation, assessment of public lands, community-based natural resource management and the extension of agroforestry technologies and practices. Efforts are ongoing to better integrate and coordinate the various NATURE components to achieve rapid, demonstrable results that can be sustained. This report identifies several issues relevant to this task and makes some specific recommendations.

The visiting team reviewed the MAFEP monitoring and evaluation (M&E) system. MAFEP and its partners should move ahead with plans to agree upon and implement improvements, considering the recommendations of the present report. These improvements focus on targeting appropriate and cost effective M&E indicators at macro and micro levels, and clarifying procedures, roles and responsibilities for collecting and processing data. Macro level data should focus on AF adoption (number of farmers and amount of farmland) and on natural resource and food impact (increased maize production, reduced soil loss, increased wood production). Micro level data should also be collected to facilitate mid-course adjustments to MAFEP implementation. These will be reflected in annual workplans.

The team reviewed the MAFEP extension role and function and offered a framework to guide and strengthen future extension programs. Overall, the team was impressed with the validity of the MAFEP's approach, progress to date and the potential for future impact. It also noted the importance of differentiating this AF extension effort, conducted by a variety of partners, from efforts to strengthen overall national extension capacity. The latter is considered outside the scope of MAFEP. The team also highlighted the importance of maintaining a national scope to AF extension efforts, profiting from past and continuing testing of technologies under a spectrum of conditions in Malawi.

The team identified the National Agroforestry Steering Committee as a key body and underutilized resource that represents many of the key stakeholders and partners in the natural resource area. The team also concluded that a major effort is warranted to move aggressively to extend agroforestry practices with these partners at the national level. Directing some concentrated effort in the NATURE program in the Middle Shire may be warranted to capitalize on the synergistic effects of MAFEP, MEMP and other program efforts there in coming years.

Introduction

1. The authors made an on-site visit to MAFEP from December 1st to 18th, 1997. The purposes of this consultation were:
 - a. To review the MAFE project with particular emphasis on the monitoring and evaluation (M&E) and assess the agroforestry extension program under development and implementation.
 - b. To work with the SO2 team (USAID, University of Arizona, the Government of Malawi and other partners) on the overall NATURE strategy and planning.

The Malawi Agroforestry Extension Project (MAFEP) is a national program that facilitates and supports partners to help farmers adopt improved agroforestry (AF) and soil conservation practices. These contribute directly to natural resource objectives (conservation of soil and forest resources). They also contribute to other USAID strategic objectives, which include improved food security and economic growth, through improved soil fertility; and democratic development, through community-based agroforestry programs. Linkages with these SO teams will continue to be developed and strengthened. This report deals with specific MAFEP objectives within the context of overall NATURE objectives. A partner Concept Paper for updating the NATURE program is under development. Additional findings and recommendations of this review team have been incorporated into an initial draft of this paper and will not be repeated herein. The Concept Paper will be reviewed and submitted to USAID and the National Agroforestry Steering Committee in late January.

Extensive discussions were held with Trent Bunderson, MAFEP coordinator, other staff and collaborators, USAID officials, the chair of the National Agroforestry Steering Committee and personnel of the Malawi Environmental Monitoring Program (MEMP). Several field trips were taken to observe the nature and level of natural resource degradation in Malawi and ongoing efforts to mitigate this degradation. The latter included visits to observe the implementation of agroforestry in demonstration sites and on-farm applications, and to discuss the program with extension officers of cooperating ministries and other organizations.

Overview of Situation in Malawi

Rapid population growth in Malawi has led to increased need for food crops. This has induced farmers (about 80 percent of the population) to extend agricultural use into virtually all arable land, including many fragile forest and steep hillside environments. In doing so, they have cut trees at a rate which is fast deforesting the nation. Wood is in high demand for cooking and building countrywide and there are few alternatives. Widespread use of other energy sources is far beyond the financial capacity of individuals or the nation. Soil erosion is a critical problem from expanding agricultural use of land, deforestation, and high runoff from rainfall. Erosion is projected to cause catastrophic problems in the foreseeable future because the current agricultural system is not sustainable. Increasing tobacco production among smallholders and others is contributing to this problem, following its liberalized cultivation and marketing. Tobacco is extremely important to the stability of Malawi's economy as it accounts for about 70 percent of foreign exchange earnings. Tobacco is more destructive to the natural resource base than food crops for several reasons. It has much higher economic returns so farmers strive to plant as much land as possible within their resource constraints. Since tobacco is subject to pests and disease problems, farmers totally clear their fields, and rarely

practice intercropping, or other soil protective measures. Finally, tobacco curing requires large amounts of wood, which places additional demand on shrinking wood supplies.

The enormity and severity of the environmental problem in Malawi is among the worst in Africa. There is an urgent need to address it as rapidly as possible because the costs of delay will increase exponentially in coming years as population continues to grow.

MAFEP is an extension project built on over 10 years of research to develop and test agroforestry (AF) technologies applicable to Malawi. That research has been carried out on research stations, demonstration sites and on-farm trials managed by smallholder farmers throughout the nation. Proven practices have demonstrated increases in crop yields, wood and fodder supplies, while reducing the volume and rate of water runoff and soil loss across a broad range of agro-ecosystems. Many technologies also generate income from sales of wood, seeds and seedlings, fruits, vetiver thatching and other products. Other technologies serve valuable uses as living barns, fences and property demarcation. In summary, agroforestry is one of the rare "win-win-win" interventions for farmers, Government and the natural resource base.

Malawi's agroforestry program is distinguished from AF programs in other nations in two major ways. First, it is a bottom-up approach that encourages farmer adaptations to real situations rather than telling farmers what to do. Only rarely does research station testing correspond closely to farmer managed applications. Because AF in Malawi is based on this farmer testing and support, it has high potential for adoption and long-term continuation. AF consists of a wide variety of proven technologies that can increase agricultural productivity in the short-run by reducing soil erosion, and increasing soil fertility and wood supplies. The program has also created important partnerships with multiple ministries, donors and implementing agencies to sustain and expand its impact. This leveraging of resources broadens its application under widely differing perspectives for the benefit of all parties (*see Appendices 1, 3 and 3A*).

The problems described above are recognized at all levels of government, the farmers including smallholders and estates, the commercial sector and donors interested in agriculture and natural resource management in Malawi. This offers a sound foundation for a major national program to address the problems. MAFEP now has readily available a set of technologies and practices ready for widespread dissemination to the users of the land resources where the problems occur.

The current phase of MAFEP is supported by USAID through a cooperative agreement under NATURE for \$1.9 million over a four year project. The previous phase of MAFEP, which was a pilot on-farm testing program to develop the current AF packages, was funded under the Agricultural Sector Assistance Program (ASAP) of USAID at \$1.8 million. Under the re-engineering process of AID, programs are now organized by strategic objectives (SO's). SO1 includes agriculture, but MAFEP new funding is contained under SO2 (NATURE) which is natural resource management. Clearly, MAFEP has contributions to both SO1 and SO2, but it will require flexibility within USAID to assure that walls and barriers are not artificially constructed between the objectives.

MAFEP does not have the resources to implement the AF extension program itself, but it provides a technical support function including educational materials, germplasm and training programs to a wide variety of cooperating organizations who do have direct implementation programs with farmers. MAFEP works directly with the Ministry of Agriculture and Irrigation and the Ministry of Forestry to involve field assistants in AF programs. It also has developed partnerships with 10 NGOs, five private sector firms, and several donor projects, notably PROSCARP with EU funding (see *Appendix 3-A*). Together, those partners currently have over 250 sites where AF programs are in progress and expanding steadily within their local areas. Additional sites will be added as additional partners become available. A National Agroforestry Steering Committee (NASC), composed of representatives from Government, donors, private and NGO oversight and implementing agencies, provides coordination and support to these efforts.

In summary, there is an urgent need to shorten the time from problem identification to adoption of sustainable natural resource management technologies. It is critical that Malawi move forward quickly to foster adoption of technologies and practices leading to behavioral changes by land managers (farmers). While continued testing and adaptation are important during the adoption process, it is imperative that currently proven AF technologies be transferred to farmers as rapidly and as widely as possible.

USAID NATURE Program

The SO2 of USAID in Malawi is: *Increased Sustainable Use, Conservation, and Management of Natural Resources*. The following specific programs or emphases fall within SO2:

1. **Policy, Legislation and Institutional Reform** - Initiatives to encourage and facilitate government legislative and institutional reform in the areas of environment and natural resources management.
2. **Agroforestry** - Technologies and practices to prevent and mitigate environmental degradation. (Described above).
3. **Environmental Monitoring** - Building national capacity for providing environmental information to guide mitigation and policy decisions.
4. **Assessment of Public Lands** - Characterization of environmental status and use of publicly-held lands.
5. **Community Based Natural Resource Management** - To be developed in 1998.

USAID/Malawi has identified six issues for current and future attention in the NATURE program as well as other strategic objectives. Some observations and suggestions with respect to these issues are offered for consideration with particular attention to MAFEP and how it can most effectively contribute to USAID objectives.

Scope and Focus:

At the broadest level, the emphasis on policy changes has had good progress, at least on paper, but there are still gaps between the national policy level and field implementation. Liberalization of tobacco production has given small farmers a significant foothold in the market and they are proving capable of competing successfully with the larger estates, at least in the short run. This has provided added income generation opportunities to the smallholder sector in agriculture. The removal of fertilizer subsidies is another step forward at the policy level. Cheap or free fertilizer acts as a disincentive for farmers to adopt AF technologies since they can achieve a rapid yield boost in the short run without worrying about soil degradation. A next step in policy reform should consider ways to encourage tree growing and soil conservation on tobacco farms of all sizes. Tobacco production is a large user of wood and, with very few exceptions, the farmers are not producing anything approaching their wood requirements. This places extra pressure on all farmers as well as non-farmers who need wood directly or indirectly.

Traditional policy alternatives of taxes or subsidies might be used to devise means of getting tobacco growers to produce more wood, but there are other possibilities. One idea is to use a market approach that requires the tobacco industry to be self sufficiency in wood production, but it does not mean each farmer should grow all his/her wood. In some cases, it may be more efficient for farmer A to concentrate on tobacco production, and paying farmer B to produce wood for both of them. This could be extended to all sorts of multi-party arrangements, but it needs much more analysis and thought.

At the field operational level, there are several issues involving the scope of activities under NATURE. These programs should certainly support the policy framework adjustments being made. Geographic integration at a few small regional sites is also vital for new programs that require research, testing and demonstration before broader application. With five different, but complementary programs in NATURE, it makes sense to identify a region or location where they may all devote some part of their program resources to find and capitalize on the synergistic aspects of collaboration among them. Given the agro-ecological and socio-economic diversity of Malawi, as well as political factors, consideration should be given to moving as soon as practical to have at least limited efforts in areas representative of the three major regions of the country (North, Central and South).

Programs that have been developed, tested and found suitable for national implementation must move forward as expeditiously as possible and not be restricted to one area. MAFEP is the best example of this sort of program, now poised for widespread extension and adoption. With respect to tobacco, MAFEP has the technical information and support capacity to make a major contribution to improved wood production on tobacco farms. Suitable options include woodlots, living barns, border planting, improved fallows, and tree intercropping. Other conservation practices such as vetiver strips in tobacco fields can reduce soil loss while providing high quality thatch for sheds and houses. For food crop production, MAFEP has tested technologies suitable for all the production zones of the country. In addition, it already has in place a broad and growing network of partners prepared to expand the extension delivery if they have the technical support, training and other backup. USAID funding support for MAFEP will contribute to both SO1 and SO2 by improving both farm incomes and natural resource management.

In discussions about the NATURE program there were some references to "focus" as a measure of the scope of the program. In most cases, focus was used to denote a fairly specific geographic area rather than a national effort. The focus of a program should be interpreted to include the specificity of its programs, objectives and expected results. MAFEP has:

- a very clear focus on agroforestry with a well defined subject matter,
- a track record of research with experience-based technologies and practices,
- tested and adapted agroforestry and soil conservation technologies over a variety of climatic and geographic areas nationally,
- objectives of improving both farmer incomes and natural resource management, and
- a track record that indicates that bottom-up approaches of working with farmers can lead to sustained adoption of the AF practices.

With this sharp focus, it is important to expand AF adoption at the national level.

Institutional Affiliation:

The aid community in Africa faces difficulties in working with government organizations that have limited capacity. The capacity may be limited for various reasons. Some are economic, some are political and some are cultural. The reality of building long-term institutional capacity takes time, patience and commitment. In the long run, it is the host country institutions (public and private) that have to take responsibility themselves. In the short run, there are likely to be advantages of working with and through non-government organizations or the private sector. A balanced mix of the above is most often the best approach.

The key ministries for NATURE are the Ministry of Agriculture & Irrigation and Ministry of Forestry, Fisheries and Environmental Affairs. Both have a critical interest in the outcome of USAID programs. As such, efforts should continue to build and strengthen cooperation at every opportunity. NATURE should also work to establish and maintain collaborative relationships with other groups including NGOs, the private sector and other donor funded programs. The National Agroforestry Steering Committee is made up of senior personnel from both government and non-government organizations which cuts across ministries and sectors. MAFEP is an excellent working model of how such a variety of collaboration can occur. This should be facilitated to the greatest extent possible because it has already demonstrated its capacity to leverage USAID and other donor resources many times over.

Performance Based Budgeting:

Experience by USAID and others in Africa indicates that performance-based budgeting can work well at lower levels of organizations where program activities and operations are taking place. The outcomes are easier to identify, observe and measure which can provide a basis for budgeting decisions. However, this is seldom an effective approach at higher levels such as line ministries. One reason is that host government programs are subject to fluctuations in funding and program expectations arising from factors beyond their control. Another factor may be the uncertainty of obtaining sufficient qualified staff to implement programs or to monitor expenditures based on results. Some agencies also take funds with promises they know cannot be fulfilled due to other more politically important uses for these resources. They will be back for more with a list of excuses why the past period was not successful.

There is a tradeoff to consider with performance-based budgeting. One can err on the side of creating too much future uncertainty by providing funding for short periods with future funding based on performance. Many programs need a large infusion of investment in either human or physical capital at the beginning (which may take several years) before program payoffs result. One can also err by not holding agencies or organizations firmly responsible for their commitments, leading to limited or non-existent payoffs. Consequently, the application of performance based budgeting should be approached with caution and decisions made based on the expectations of each individual program. If the approach is used, there must be relatively short-term, clearly defined objectives at discrete points in the overall process upon which budgeting decisions are to be made.

Delivery of Assistance:

About three-fourths of the NATURE funds have been earmarked for non-project assistance (NPA). The first installment seems to have produced some policy reform on paper, but it is not clear how much more progress will be made. A pressing concern at present is to get the public institutions moving ahead to facilitate change and adoption of new approaches to natural resource management. Malawi has moved in the direction of letting market forces provide the signals and incentives to decision makers which is the right way to go. These market forces are expected to contribute to improving agriculture, but more action by all the partners involved is needed. It is recommended that some of the NPA funds be reallocated to set up a national Agricultural and Forest Resources Challenge Fund to be administered by an expanded role for the National Agroforestry Steering Committee (perhaps re-titled to reflect the overall NATURE mandate). Funds should also be reallocated from NPA to project assistance to support salary and operational support for the Secretariat of the NASC, whose effectiveness is presently compromised by the part-time nature of the Secretariats' duties. The challenge fund would accept, review and fund selected proposals from government or non-government organizations for specific programs or projects in support of the overall NATURE objectives. The grants would be short-term (<3 years) and probably not renewable. Criteria for awards would include the probability that investments would lead to behavioral changes that would be sustained beyond the granting period. Experience in Africa and elsewhere has demonstrated that fairly modest amounts of funding to some organizations could make a huge difference between modest and significant progress in meeting objectives.

MAFEP is now at the stage for program delivery in a major way after years of development, testing and trial on farms of varying size, climate and management. It has moved from a program oriented to adaptive research to one which is oriented to extension. It has the goods to deliver to a wide range of partners with existing on-the-ground projects where the AF technologies and practices can be extended. MAFEP, while not responsible for direct extension delivery, must be well aware of the principles, methods and activities needed to carry out an effective extension program. These concepts must be built into its training and support programs for partners.

MAFEP is not an implementation project. It has less than \$2 million over four years that cannot cater for direct implementation. It has formed partnerships with PROSCARP, NGOs and several private sector firms who deliver the extension programs, with MAFEP providing technical support, training, germplasm, educational materials and consultation services. PROSCARP is by far the largest partner. It is currently working in 213 sites nationwide, with active extension delivery programs that operate with field assistants and local farmers. Together, PROSCARP and MAFEP are developing the ability of local farmers in villages to plan, adopt and manage agroforestry and soil conservation programs on their own with

reduced support from government. Farmers and field assistants often receive training together, and jointly implement the AF and soil conservation practices in the farm community. PROSCARP does not conduct research, but relies heavily on MAFEP for technical and training support. Without MAFEP's role, PROSCARP must invent a worthy replacement, which will take several years to build up to the point where MAFEP is at the present time.

PROSCARP is embarking on a new \$30 million five year program with a target of up to 1,200 sites in the country, although not all will be receiving direct support simultaneously. They plan to build the capacity of farmers and FAs at the community level to take responsibility for expanding adoption. Thereafter, the project will move on to other sites and replicate the process. PROSCARP has planned extensive use of MAFEP support, which provides an excellent example of leveraging resources. In this case, USAID may devote say 75 percent of its budgeted AF resources to working with PROSCARP, which is about \$1.4 million in four years. For this modest investment, the total payoff in funds spent on delivery of agroforestry extension programs is multiplied by up to \$20 million of PROSCARP funding. Only rarely do private investments come close to reaching this amount of leverage.

Donor Coordination:

There is sometimes a tendency to divide a recipient nation into geographic areas for different donors, or to divide it by issues or problems. Some of this makes good sense, but donors should not be entirely wedded to this approach. Each donor brings or provides a set of skills, ideas and resources that may have great complementarity to those of other donors. Capitalizing on the comparative advantages of each donor in a collaborative way can lead to major benefits for the host country. While there are transaction costs to securing and mainlining effective collaboration, there is ample evidence that, in many cases, it is well worth the effort. MAFEP has been quite successful at forging linkages with other organizations. This has multiplied the benefits of the USAID funds available to MAFEP (see above example on leveraging EU resources in supporting the shared objectives to improve food security and natural resource management). Clearly, there will always be some areas where donors may not work closely together, but those can be carried on separately.

Monitoring and Evaluation

Monitoring and evaluation falls into two major categories for projects such as MAFEP:

1. Macro measures that address the degree of accomplishment of overall project objectives. These measures require both baseline and end-of-project assessment.
2. Micro/internal monitoring and evaluation processes that address technical and procedural aspects of project management and thereby facilitate mid-course adjustments to better achieve the macro objectives. For MAFEP, these micro monitoring and evaluation activities are of two types:
 - a. Assessments designed to fine tune agroforestry/soil conserving (AF/SC) practices to better fit different ecological regions and/or differing socio-economic environments of potential adopters; and
 - b. Applied studies designed to determine socio-economic factors influencing rate of adoption of AF/SC practices.

Macro Monitoring and Evaluation:

There are five primary elements needed in an appropriate macro monitoring and evaluation program for MAFEP:

1. Indicators should reflect the objectives of USAID's SO2. Also, because the effective operators of AF/SC practices are farmers, some of the key indicators may fall within SO1.
2. The proposed M&E must be feasible within the available financial and human resources.
3. Results must be obtained in a timely manner.
4. Findings should be of a sufficiently high confidence level that managerial decisions based on the M&E results are warranted.
5. Coordination with the M&E activities of other cooperators in SO2 is important in order to secure an improved picture of the consequences upon the natural resource base of Malawi.

Given these criteria, the most basic indicator for MAFEP is **adoption** in terms of:

- a. number of farmers; and
- b. area of farm land covered by AF/SC practices.

MAFEP has a set of recommended and farmer tested practices. These practices will continue to be fine tuned and additional practices are likely to be developed with high potential for adoption. The urgent need in Malawi is to have these AF/SC practices in place on farmer fields. This requires both farmer acceptance and proper management of the practices over an increased land area. Monitoring of the land area under recommended AF/SC practices will permit estimation of the following three additional key indicators of the macro impacts of MAFEP on the selected sites:

1. Increased maize production (tons),
2. Reduced soil loss (tons), and
3. Increased wood production (cubic meters).

The rationale for these three indicators is as follows:

Maize. This cereal is by far the major food crop of Malawi. Earlier research evidenced that, given the physical/biological/ecological constraints facing farmers, maize yields are the dominant factor influencing farmer adoption of AF/SC practices.

Soil loss. The quantity and quality of soil retained on a plot of land is the primary determinant of sustainability of plant production for either food or wood. Existing research results will provide the response relationship. Improved coordination between MAFEP and related MEMP efforts will provide validation of estimates of soil loss under AF/SC practices.

Wood production. Deforestation and the subsequent agricultural practices are the major contributing factors to soil erosion. Depending upon the particular practices, AF will result in the production of varying quantities of wood. Such wood production reduces tree cutting pressures on the forested lands of Malawi.

Recommended Procedures for Obtaining Macro Indicators:

It is recommended that the procedures discussed below be followed on all partner sites. If either the total number of sites or the number of MAFEP sites to be intensively monitored are reduced, selection of the subset of sites should take into consideration the following issues:

1. Sites should be as representative as possible of the physical/biological/ecological characteristics of the array of different natural resource environments in Malawi.
2. Sites should include representation from the different cooperators with MAFEP, e.g., PROSCARP, different donors, NGOs, private sector representatives, etc..
3. Sites should be included where activities of other USAID supported projects within either SO2 or SO1 are involved, particularly, MEMP and the ACDI efforts with smallholder tobacco growers.

Since data collection is based on specific sites, the procedures discussed below relate to M&E activities at each site. The impacts for all sites supported by MAFEP will be a simple aggregation across sites subject to the M&E process. To the extent that these sites, or some subset of them, are representative of the major ecological zones of Malawi, the area based information could be extrapolated to a rough approximation of national impacts.

Each PROSCARP site has a Catchment Area Development Committee (CADC) and all other sites have or will have a similar community based committee. The term, CADC, as used in this report refers to all such community-based committees. These committees, with the support of the relevant Field Assistants (FA) for that sector, are to complete a set of forms as part of the MAFEP community based monitoring and evaluation effort (See draft version as Appendix D of MAFEP Annual Work Plan, 1997-98). One of its main functions will be as an extension tool to enhance farmer adoption of recommended AF/SC practices (See *Appendix 1* for greater detail on multiplier effects). The Community Based Monitoring and Evaluation effort (CBM&E) is to specify for each year the total number of farmers in the site, and the number of farmers who have adopted practices either singly or in combination and the number who have adopted no AF/SC recommended practice.

Some farms will have more than one AF/SC practice on the same plot of land so the problem is to determine the land area under each combination of practices. This is to assure that there is no double counting of land area reported under AF/SC practices. It is recommended that a simple "base transect line" procedure be used to secure estimates of land area under each individual single practice and each possible combination of practices. Standard procedures for implementing the base transect line approach need to be used giving adequate consideration to pertinent configurations of individual land holdings in the community, landscape features, etc.

It is anticipated that the FA or NGO representative for each site will conduct these transect studies after appropriate training through MAFEP. Simple forms listing all the AF/SC practices of interest, plus any relevant combinations thereof, should be developed to facilitate data collection and subsequent entry into data bases. After laying out the transect, the enumerator, with few exceptions, need only measure the distance along the transect (of a specified width) having a particular AF/SC practice or practices. This is directly transferable into area. Farmers whose fields are intersected will be interviewed for adoption of practices such as live barns, woodlots and boundary plantings that are often outside the farm area.

It would be desirable to obtain qualitative assessments of AF/SC practices since the yield responsiveness and soil conserving effectiveness of some practices are highly correlated with proper implementation. Thus, it is recommended that the FA performing the transect study provide a qualitative assessment of each separately defined practice within the transect segment. A commonly agreed upon scale of effectiveness and some degree of training to promote uniformity of scoring across sites would be desirable. It is conceptually possible to provide quantitative assessments of the quality of some AF/SC practices, e.g., percent of contours more than "X" degrees off the optimum, "Z" percent of ridges tied together, etc. However, costs of obtaining this additional detail is likely to outweigh the benefits.

Given the known land area of a site, the area under various practices can be estimated for each site using the above procedures. To the extent the representativeness of sites to the region is known, and, if an estimated of outside-of-site adoption is available, the data will be extrapolated to a larger region and potentially to the nation.

The duration of MAFEP makes yield gathering and soil loss estimates from base transect line plots impractical. Thus, it is recommended that yield and soil loss estimates be obtained from past and continuing long-term farmer based trials in Malawi. MEMP activities in areas overlapping MAFEP supported sites should provide more specific estimates of yields and soil loss for these sites. The short life of MAFEP argues for a beginning baseline determination of area under AF/SC practices and an end-of-project determination. If the rate of adoption over time in the early years of the project is important, interim transect studies could be conducted. However, the intense on-site activity by the FA in making the transect observations would result in extensive interaction with the farmers and the consequent group dynamics of the situation might well lead to a non-representative rate of adoption. Therefore, interim transects within MAFEP sites are not recommended.

It is recommended that a limited number of transects be run at locations generally similar to a few regionally representative MAFEP supported sites. These off-site transects should be conducted at varying distances from a base MAFEP site. Such an effort will provide insights into the temporal and spatial characteristics of AF/SC practice diffusion under the MAFEP model. The more distant transects would include those presumably less influenced by spillover effects and would constitute a form of control measurement.

This simple transect procedure will generate useful evaluative information on the macro impacts of MAFEP interventions over the life of the project. The procedure will underestimate effects arising from multiplier effects to lands outside the MAFEP sites. For example, MAFEP currently assists some ADDs in non project areas through training in AF/SC practices, provision of seed, etc. Adoption of AF/SC practices arising from these efforts will not be captured by the interim site transects. Additionally, the macro impacts will be understated to the extent that farmers continue to adopt AF/SC practices after the end of MAFEP. Under reporting will also occur for a practice such as planting of *F. Albida* since the farmer will experience increased effectiveness over subsequent years as the canopy cover expands with maturity of the tree. As more farmers adopt soil conserving practices it is obvious that a greater percent of the aggregate surface area of a region will experience reduced volume and velocity of runoff. This cumulative effect will reduce imposition of adverse externalities such as washed out ridges on downstream land owners. After an extended period of time and depending upon the nature and extent of natural events such as heavy rainfall, and the extent and location of sites, the adoption of AF/SC practices may reduce adverse externalities. For example, decreased siltation of streams impacts non-farm activities such as fisheries and power generation.

Monitoring and Evaluation of Micro Indicators:

As evident from the title, these monitoring efforts are primarily designed to facilitate mid-course adjustments to MAFEP implementation and will be reflected in annual plans of work. Some of the needed measures are common to other projects of a similar nature. For example, there is a need to gain improved information on the biological response rates under alternative management regimes for AF/SC practices. This might take the form of such things as planting dates, pruning times, severity of pruning, plant spacings, etc. To the extent such studies are conducted by MAFEP, they should be heavily based on farmer conditions, including farmer perceptions of issues and opportunities. As the number of sites expand to different ecological zones, the issue of local adaptability becomes more important. Field assistants, NGO representatives and other MAFEP partners should be encouraged to participate in and promote farmer testing of alternative management schemes in their region. MAFEP and personnel from cooperating entities, in concert with local farmers, will be in the best position to identify particular topics needing further study. The character of these studies will evolve as experience is gained. Thus, the number and specific nature of studies should be specified in evolving annual plans-of-work. It is inappropriate for external reviewers not intimately familiar with the in-country scene to recommend specific studies.

Practice adoption by individual farmers, given biological information such as that developed in the above mentioned studies, has been subject to extensive study for many years in both developed and developing countries. Certain general principles are well recognized, e.g., magnitude of potential gains and losses, risk preference of the decision maker, stage in family life cycle, social position in the community, etc. However, AF/SC practices present a more complex decision environment due to the complexity of possible interactions among practices and environmental factors as well as the temporal pattern of benefit streams.

Consequently, MAFEP should remain active in promoting efforts to better understand the factors influencing the key macro indicator, adoption of practices by farmers. An example might be the current research by Ian Hayes (Wye College graduate student funded by Rockefeller Foundation with support from MAFEP), which is providing insights on the adoption of practices. As with the biological research, the character of specific socioeconomic research needs will evolve. Therefore, the character of specific studies should emerge as experience is gained and subsequently become components of future annual plans-of-work.

Rate of adoption studies commonly include at least two components: 1) the physical and biological environment of farmers and 2) the socioeconomic context of decision-making. MAFEP, its direct cooperators and others involved in related activities of either SO2 or SO1 should attempt to collect as comparable data as reasonable. Early and continuing discussions among MAFEP, MEMP and other related project staff will strengthen their project designs and, in some instances, make their conclusions valid over a wider audience.

A significant part of MAFEP involves an element of both M&E and promoting adoption of AF/SC practices. The proposed "Community Based Monitoring and Evaluation" (CBM&E) activities of MAFEP are under development and contain elements of adoption promotion and M&E. As noted earlier, the extension aspect of CBM&E is discussed elsewhere in this report. The draft forms included as Appendix D to the MAFEP annual plan of work for 1997-98 and discussions with MAFEP staff are the basis for the following comments on its use as an M&E procedure. The currently proposed CBM&E forms will be revised to improve the accuracy and completeness of data collection on AF/SC practices.

The CBM&E procedure is to provide: a) the total number of potential adopters (farmers) in each site; and b) the number who have adopted each individual practice, regardless of the land area covered by the practice or whether it is performed singly or in combination with other AF/SC practices on a given plot of land. The CBM&E effort is to be monitored by the FA, relevant NGO representative at NGO sites, and similar individuals at other sites. These site monitors are to be trained and provided continuing technical support by MAFEP staff in order to assure accuracy and consistency of reporting across sites. The actual development of the data, except that referred to as "quantitative sample", will be by the Catchment Area Development Committee at each site.

As currently proposed, the CBM&E process is to be conducted each year by the CADC. Although land area under each practice will not be obtained by this process, the procedure will enable monitoring of the number and percentage of farmers potentially available to adopt each practice at each of the current 250+ sites. Use of consistent forms and procedures will permit aggregation across all sites. These are the numbers to be reported as the MACRO indicator of number of farmers adopting recommended AF/SC practices. (Note that this is not the procedure for obtaining land area under AF/SC practices.)

Additionally, the CBM&E process will enable MAFEP to examine differences in adoption rates, by practice and in the aggregate, among various collections of sites. This information can be used by MAFEP and its cooperators to adjust approaches used at particular sites. Among the potentially useful comparisons might be the following, among others:

- across latitudes (north-central-south)
- across differences in annual average precipitation
- among soil, slope or other ecological characteristics
- across ethnic groupings (if such exist)
- between sites with significant tobacco production versus non-tobacco sites
- between sites with and without significant livestock

Additionally, the CADCs are to collect selected quantitative information on subcomponents of some AF/SC practices. For example, for contour marker ridges and ridge re-alignment, they are to secure information on number of farmers with their whole field completed versus only part of their field completed. For those involved in systematic tree-planting, they are to ascertain how many farmers planted enough trees and how many want more trees (if this is to be done, it would appear useful for the enumerator to ascertain the number of trees desired, and perhaps numbers planted). This type of information will be useful for internal MAFEP project management on a site by site basis and in the aggregate for activities that require physical inputs such as seed. However, these types of measures do not constitute macro indicators of the success of the overall project.

In terms of M&E, the development of "farmer perception" information, by practice, is similar to the above collection of quantitative information on sub-components of AF/SC practices. That is, the farmer perception information is chiefly useful for internal MAFEP management.

Given that the CBM&E process will develop this information for internal use and that it is group (CADC) generated, it should be collected in a comparable manner across sites. It is also recommended that MAFEP secure information on key physical/biological/ecological as well as socioeconomic characteristics of each site. This will provide evidence by practice, of whether farmer perceptions are 1) an important determinant of adoption (virtually conceded) and 2) if important, how farmer perceptions are influenced by both the physical and socioeconomic

environments faced by farmers. Although not a M&E indicator for MAFEP, this information, gathered across more than 250 sites, may provide very useful insights into the appropriate design of future AF projects whether within or external to Malawi.

The CBM&E process will generate "next season target" information, by practice, for each site. This information, given reasonable validity, will provide valuable information to MAFEP and its partners for logistical issues such as seed needs, vetiver nurseries, etc. Such monitoring will facilitate revision of targets and support levels in annual plans of work.

MAFEP staff responsible for drafting the forms for each practice have both research evidence and an "experience based" knowledge to determine specific information to be gathered on the practices in place on farmer fields. There is a subjective grade (evaluation) to be given for the "overall condition" of the practice on the field of concern. The majority, if not all, of the other observations on the status of the practice are objectively quantifiable. This includes such things as spacing (meters), number of live plants, etc. Although there is an element of subjectivity to the overall condition scoring of the practice, there is no particular reason to expect any conscious bias on the part of enumerators. Scaling procedures are being developed by MAFEP staff. The scaling process needs to be carefully developed and pretested. Subsequently, appropriate training needs to be provided to the Field Assistants and others who will make such evaluations.

A sizeable quantity of data will be collected with both the transect and CBM&E components of MAFEP. Collection of the primary data is to be done by or under the leadership of Field Assistants at the individual sites. If aggregates of the data are to be meaningful, there must be training of enumerators and some element of monitoring of the process and product of each data collection effort. Initial data entry and summarization of site data will be done at the ADD level. This will reduce the data processing task at the MAFEP level. Monitoring of the ADD level by MAFEP staff will be necessary to assure uniformity across districts. This, coupled with analysis requirements represents a sizeable task. MAFEP needs to assure itself that the necessary resources are available to perform these tasks in a timely manner.

In summary, the M&E needs of MAFEP to evaluate overall project success can be effectively met by the number of adopters from the CBM&E effort, and the land area under individual or combined practices from transect line methods. Using the land areas with current yield responses and soil loss relationships, estimates of changes in maize yields, wood supplies and soil loss can be developed for sites under MAFEP. Annual CBM&E efforts and internal accounting procedures of MAFEP will be used to compare achievements against targets. This will provide an internal monitoring for MAFEP management, and regular reporting to USAID, while facilitating cooperation with partners, notably others under NATURE.

A table illustrating the M&E approach and recommendations is included as *Appendix 2*.

MAFEP Extension Program Role and Function

The review team was asked to consider and evaluate the extension program role that MAFEP can and should perform. It is important to distinguish between the first and second phases of the project. The *pilot phase* was directed at farmer testing through adaptive research with improved delivery of extension services to farm families. The *second phase* aims to increase the adoption of proven agroforestry practices by providing support services to key implementers for the new practices and technologies. MAFEP does not have the resources to

conduct the extension work directly, but has the proven capacity to provide the needed support to other organizations that have extension program responsibilities. The distinction between the two phases is important because MAFEP cannot be expected to change the extension delivery systems currently at work in Malawi, especially as agroforestry is only part of much broader extension programs. MAFEP cannot duplicate those programs nor should it try to do so. Its great strength is in providing technical support to the ADDs under the MOAI, to NGOs, and to other projects such as PROSCARP. The extent of cooperation and leveraging which MAFEP has been able to achieve, and the potential impact of this strategy, are illustrated in *Appendix 3 and Appendix 3-A*.

The Malawi Agroforestry Extension Project is poised to make a major contribution to natural resource conservation in Malawi based on tested agroforestry practices that are now ready for dissemination land-users throughout the nation. This is a brief statement of the basic principles, methods and activities of extension programs that have been developed and tested worldwide and how they may appropriately be applied to extending the AF practices available from MAFEP. It has been stressed above that MAFEP cannot conduct actual extension work, but in providing technical support, its staff need to understand the key principles, methods and activities that constitute sound extension programs.

Adoption and Diffusion Process:

When any new idea, practice or technology is developed, there is a process that takes place over time in which it may be put into use by farmers. In some cases, the process may be relatively short (< 1 year) and in others it may be much longer (>5 years). The length of time will depend on the new idea and the conditions within which it is expected to be used. For any individual who may adopt something, whether it is a new farming practice or a consumer product, the person will progress through the following stages:

- Awareness:* One has to know of something before it can be tried.
- Interest:* If it looks like it has promise, the person may move to the next stage.
- Information:* Obtaining more information about the new item or idea.
- Trial:* Testing the idea or item before full adoption or use.
- Adoption:* Using the item or idea in user's own operation of farming or consumption.
- Evaluation:* Over time the user will continue to test and evaluate if it should be continued.

If the potential user decides against the idea at any stage, the process comes to a halt.

Given the above stages through which people consider new ideas, it is important to identify different kinds of people in their rate of adoption of new technology. They fall into the following categories:

- Innovators:*** These are the first ones to try something new. They are people not satisfied with the status quo and are willing to take a chance on something different to see if it will improve their situation. These people tend to be different than their neighbors and may be viewed as rash in their actions.
- Early Adopters:*** These people watch the innovators and are quick to assess whether the new idea or *adopters*: technology may be of use to themselves. If so, they will begin to adopt it shortly after they see it tried and tested by the innovators. Both the innovators and the early adopters are often people who have sufficient resources to be able to take a risk on something new.
- Early Majority:*** After the new practice has been in operation for a while by the first two groups the *majority*: early majority (a larger number of people) try out and adopt the practice if it works for them.
- Late Majority:*** These are people who take more convincing and more time to observe and evaluate the new idea before they are willing to take it on themselves.
- Laggards:*** The last group to adopt a new idea are those who, for various reasons, wait a long time before accepting it. They may lack resources, managerial skills, or motivation to adopt it, or to effectively use it until fully proven, or they may simply be slow to catch on.

Extension education programs as described below need to understand the adoption and diffusion process and tailor the educational material they use to different groups of people who will be going through the evaluation of a new technology at different speeds. Regardless of how good an idea may be to the researcher or educator, it will not be immediately adopted by large numbers of final users. They will develop interest and evaluate its usefulness to themselves at different rates. The challenge for extension programs is to be aware of this process and adapt education to fit the specific situation.

Extension Principles:

1. ***Research and/or experienced based education.*** Extension programs must be based on technologies that have been tested and shown to be practical, feasible and capable of adoption by the target group of clients. Without this foundation the extension of practices that do not meet these criteria will destroy the present and future potential for further education by eroding trust and confidence in the extension program.

MAFEP now has a set of AF and soil conservation practices based on over 10 years of research in Malawi at multiple sites in all eight Agricultural Development Divisions involving testing in demonstration sites and on farm adaptation in a wide variety of conditions by smallholder farmers. Documentation of the research is contained in a variety of reports, publications and leaflets widely available to potential educators and adopters.

2. ***Education and not service.*** Effective extension programs are those that equip the end user with the ability to make use of the information repeatedly over time and to adapt it to his or her specific conditions based on a full understanding of the underlying principles involved. This enables the extension educator to be far more productive and

to reach more people because they do not have to act as a direct consultant or service provider for farmers each time they need to adjust or adapt the technology.

MAFEP has prepared and conducted initial training programs for extension field assistants and personnel of government, NGOs and donor projects to equip them with the knowledge, tools and understanding to impart these skills to end users on the farm.

3. ***Farmer and local community needs and concerns.*** If extension educational programs are not responsive to these needs, the acceptance and adoption rates will be quite low and much effort will be wasted. There are many examples of regional and national programs that must be changed or adapted to meet local conditions in order to be acceptable for adoption and implementation.

MAFEP and its partners are promoting the establishment of local Catchment Area Development Committees to work with the field assistants and other organizational personnel who work with farmers to assure that local concerns are addressed. This is an ongoing process to monitor and adapt new technologies and opportunities as appropriate.

4. ***Multiplier effect.*** A very important method of extension is to gain adoption by some farmers who, after they make a successful use of the new technologies, will serve as an example or model to their neighbors who can observe the improved results and later adopt them on their own farms. This process may be replicated many times if the practices are clearly advantageous to the user and demonstrate the benefits in clearly understandable ways.

MAFEP is demonstrating the successful transfer of AF technologies between and among farmers in several ways. The CADCs at each site provide an important mechanism for this to take place. The AF practices which produce larger quantities of harvestable wood products and reduce soil erosion while increasing crop yields should prove to be of interest to farmers who observe their neighbors who have successfully adopted the AF technologies. The CADC will be involved in community based monitoring and evaluation which will be an important extension tool in spreading information among farmers in the community.

Extension Methods:

1. ***Ongoing planning for educational programs.*** Effective educational programs consist of a well organized and logical set of activities and events that build upon each other and complement past results. Extension educators need to think how what they do now will lead into or build the base for future activities. These in turn must build on earlier efforts and lessons learned to expand their breadth and depth.

MAFEP is not an implementation program itself, but rather a source of technical and logistical support to the people in GOM, NGOs and private organizations who will take the information forward to final users. This means that MAFEP has to have adequate supplies of germplasm for the AF practices to be disseminated. They need to provide training to the people who will conduct the extension education. They need to also provide supporting materials in written or visual form to back up the other materials and information. MAFEP is prepared to carry out these functions.

2. ***Multiple and supporting messages.*** There is no best way for carrying out extension programs. People learn from a variety of means and it is important to assure that among the means employed, the messages are clearly consistent on technical content and communicated. It does not require that everything carry exactly the same message, but they cannot be contradictory.

MAFEP has developed materials and information to be communicated in various ways by educators. These may need to be adjusted to fit local conditions, but they should continue to adhere to the main emphases of the technologies. These materials will be made available through training and other contacts with the educators.

3. ***Adaptive or applied research.*** Research and extension are two very closely connected functions that need to be mutually reinforcing to be effective. Neither can be carried out in isolation from the other. In many circumstances, it will be difficult or impossible to define a difference between them. Research needs to be aware of the real needs of the farmers through contacts with extension agents and on-farm trials of adoption with extension programs. Extension, on the other hand, needs to ensure that research meets real farmer needs and priorities. This should be an ongoing interactive and collaborative approach.

MAFEP has conducted extensive research on test plots, on demonstration sites and on farms. It is now important to move forward quickly with extending proven practices. There will be some continuing need for adaptive research to make improvements as practices are implemented. This is a normal and acceptable extension method.

4. ***Wholesale extension education instead of retail delivery (intermediate customer).*** In some instances, the extension program will be provided to people who are not the end user, but who interact closely with the end user because they either are providing other services to the farmer or want to buy products from him/her. To the extent it is in the interest of the intermediary customers to see that the farmer becomes more successful in adopting new technologies, they can be effective in communicating and transferring those technologies.

MAFEP is well suited to providing the materials and technical support. The training programs that have been developed to date and in the future can easily be adapted to various intermediate audiences who can in turn move it on to farmers.

5. ***Monitoring and evaluation (M & E).*** Extension programs and support services need to track progress (results) so future decisions can be made with good information. There are several sets of decision makers. The first level is the educators at the field level who need to know what is working, how and why. This will enable them to make regular adjustments to improve upon the program and to spot problems that can be corrected before they compound themselves. The next decision set is the overall program (in this case MAFEP) to show how the materials, training and supplies are being used and with what levels of success. It will provide information upon which to make overall adjustments as needed. The third level of decision makers comprises the funders or policy makers who have some aggregate interest in the success of the program from a regional, national or international perspective. In the development of M & E programs it is important to consider the balance of resources and how they are

allocated to ensure that management has critical information for implementation decision making without impeding the delivery of programs.

MAFEP is refining a monitoring and evaluation system to provide the information for decisions described above. It will have important involvement by field assistants and other personnel at the extension education level and the local steering committees where AF extension is taking place. It is important that the M & E system meets the needs of the wide variety of participating partners without making undue demands on their program resources in getting the information needed.

Extension Activities:

MAFEP will not be directly and closely involved in the local extension activities because it is one step removed as the technical support arm to the implementers. It will, however, provide examples of various materials and activities that will be part of the ongoing extension program activities.

1. ***Publications.*** This may include a wide range of materials from technical bulletins for professionals to very simple and basic fact sheets for farmers. It also includes news articles, material for radio programs, films and videos for direct showing to farmers and other materials.
2. ***On farm visits - direct consultation.*** Field assistants and other extension personnel will use this method extensively, but they must try to maximize the educational delivery so that other farmers may learn from observing early adopters. This is critical because the field level personnel cannot interact intensively with all farmers.
3. ***Educational meetings.*** Where this is an appropriate method, films, videos or handouts along with spoken messages can be used in various combinations.
4. ***Demonstration sites.*** Demonstration plots are an effective tool to allow farmers to observe new practices and their management. This is most effective when demonstrations are on a real farm under the farmer's control and decision making.

Conclusions

1. Selected ministries of GOM (within their resource constraints) are heavily committed to addressing natural resource management issues. They see and understand the nature of the problem and the urgency of moving to correct it. USAID, other donors and partner organizations are committed to this process. Agroforestry technologies and practices, as broadly defined in MAFEP and as tested in Malawi, show greater potential for immediate and long-lasting impact than any identified alternatives. In addition, communities are already adopting these technologies and offer a framework for further development and testing of policies, community-based NRM and monitoring and evaluation systems. A major effort is warranted to move aggressively to extend agroforestry practices through those partners at the national level.
2. There is a case to be made for directing some concentrated effort in the NATURE program in the Middle Shire to capitalize on the synergistic effects of MAFEP, MEMP and other program efforts there in coming years. This is quite possible within the resources of MAFEP, but to withdraw any support from its broad involvement with

PROSCARP and other partners on a national level would be extremely shortsighted and wasteful of resources that have been built up over the last 10 years.

3. The recommendations in this report on the monitoring and evaluation component of MAFEP should be given careful consideration and the resulting M&E plan should be one jointly developed in consultation with the partners who are actually doing the agroforestry extension work with villages and farmers.
4. MAFEP has evolved from a project principally devoted to adaptive research, on-farm testing and pilot extension of agroforestry technologies and practices to one where it is providing the technical support to its partners for direct and wide extension in the field. The extension principles, methods and activities discussed in the previous section should be used as the basis for the planning, training and other technical support to be provided by MAFEP.
5. The National Agroforestry Steering Committee provides a mechanism for linking and guiding GOM ministries, donors and other organizations for broader application of agroforestry and other initiatives within the NATURE program. Efforts should be undertaken to explore ways to better capitalize on this institutional structure. One possibility is to assign it responsibility for the proposed Agricultural and Forest Resources Challenge Fund. It may also be advisable to explore changing its name to acknowledge and better reflect its potential broader contribution.
6. USAID reengineering has provided a new model for how to define strategic objectives and develop programs to reach them. Thus far it has been very time and effort intensive for partners who are carrying out programs. For example, the first year of the phase of the MAFEP extended under NATURE is nearly complete and an annual workplan has not yet been approved. This appears to be more micro management than is warranted. When new approaches are in the implementation stage, it is easy to fall into a situation where the bureaucracy gets in the way of programs. It is important for USAID to look at the SO's in ways that facilitate and support program progress rather than impeding it.
7. The review team is impressed by the commitment and performance to date of MAFEP and its partners. If timing and orientation of decision making is results oriented, the potential for significant progress and impact is substantial. The review team urges all partners to proceed with this in mind.

Appendix 1: Impacts of Alternative Site Numbers for MAFE

The last several years of adaptive research and extension activities on Malawi's farms by MAFEP and its predecessors have provided data on maize and wood yields as well as soil loss information under various agroforestry practices.

Given the seriousness of Malawi's natural resource situation, the proven status of the recommended practices, and the priorities of the Government of Malawi, adoption of these practices appears critical to Malawi as well as to meeting the objectives of SO2. In order to address these concerns, MAFEP, in concert with its many partners, proposes to conduct a carefully structured and monitored project on approximately 250 sites throughout Malawi. Focusing on a narrow geographic region, to the exclusion of the proposed national program of MAFEP, has serious implications for national food and wood production as well as loss of soil resources through erosion. Suggestions for the appropriate number of sites have ranged from three, under a narrow geographic focus, to the 250 of the current MAFEP program..

It is important to recognize that a program involving 250 sites, such as the MAFEP effort, requires a national distribution of sites. The national orientation arises from two major factors. First, and perhaps most importantly, success of MAFEP is critically dependent upon the carefully developed relationships and support of multiple cooperators. Included among these are: PROSCARP (EU), several NGOs, private sector firms, etc. These cooperators are the on-the-ground implementers of the programs to secure adoption of AF practices by farmers. These cooperators have specific regional responsibilities. The vital implementing resources of PROSCARP cannot be reallocated to sites outside their assigned areas of responsibility. The NGOs and private sector cooperators have commitments to existing sites. Secondly, even if it were logistically possible to move needed resources to a narrow geographic region, such a concentration would restrict the capturing of spillover effects into adjoining regions.

Additionally, a national distribution of sites reduces the risk associated with regionally concentrated adverse external factors such as rainfall patterns, plant disease or pest outbreaks. A rarely occurring adverse external event may discredit an otherwise appropriate practice from receiving general adoption.

Research results from earlier agroforestry activities and anticipated rates of adoption of selected agroforestry and soil conservation practices were used in this exercise to provide information on the aggregate consequences of selecting three versus 250 sites. Projections were made of annual maize production (used as a key food indicator), annual wood production, and annual soil losses occurring five and ten years in the future. Obviously, the differences are of a 3:250 magnitude. Results of the simulations, assuming number of sites had no effect on farmer performance of the agroforestry practices, are shown in Table 1.

Appendix 1 (continued)

Table 1:

Projected Soil Savings and Production of Maize and Wood From 3 Versus 250 Sites of 100 Hectares Each Under MAFEP Recommended Agroforestry Practices

Item	Year	Number of Sites	
		3 Sites	250 sites
Maize (tons)	0	300	25,000
	5	449	37,375
	10	727	60,600
Wood (cubic meters)	0	20	5,000
	5	345	28,780
	10	758	63,200
Annual Soil savings (tons)	0	0	0
	5	3683	306,950
	10	4533	377,750

The following agroforestry practices were incorporated into this model: contours, contours with vetiver strips, alley cropping, *F. albida* plantings, improved fallows, woodlots, and homestead/boundary trees. Estimates of maize yields, wood production and soil savings were developed from earlier agroforestry project activities and other literature in the tropics. The adoption rates were based on experience with MAFEP's 13 existing sites. The initial year (year 0) assumed current average national levels of production and soil loss. After five years it was projected that 25% of the land area within a site would be under one or more of the following AF practices: alley cropping, *F. albida* plantings with a 25% canopy cover, or a 4-year improved fallow rotation. Additionally, it was projected that 28% of the farmers would have woodlots of approximately 50 trees and 41% would have 50 trees planted as homestead/boundary trees. At the end of ten years, 64% of the cropland area was assumed to be under the same three agroforestry cropping systems and that 80% of the farmers would have woodlots and homestead/boundary plantings of 50 trees each.

Rather than using maize, wood, and soil measures, an alternative approach for assessing the national level consequences of 3 versus 250 sites could involve the number of people impacted. At the end of ten years enough additional maize would be forthcoming from 250 sites, rather than 3, to meet the annual cereal requirement (232 kgs/capita) for over 250,000 people or 2.2% of Malawi's current population. Based on a per capita annual wood requirement of 0.85 cubic meters, the wood needs of 73,461 additional people would be met under the 250 site scenario by the tenth year.

Appendix 1 continued

The figures in Table 2 reflect the number of individuals who would have had their annual maize and wood requirements met from three rather than 250 agroforestry sites.

Table 2:

Number of Individuals Whose Cereal Needs Would Be Met With 3 and 250 Sites

Commodity	Year	Number of Sites	
		3 Sites	250 sites
Maize	0	1,293	107,759
	5	1,935	161,099
	10	3,134	261,207
Wood	0	24	5,883
	5	406	33,859
	10	892	74,353

Appendix 2: Illustrative Example of Core Monitoring and Evaluation Components - MAFE-December 1997*

M&E Component	Purpose	Examples of key data	Time	Process: Responsibility and Procedures
CBM&E group assessment at each site	Results/achievements per site, for internal review and planning, and for extrapolation of results.	No. adopters physical SC practices No. seedlings raised per species	Dec.	<p>MAFE:</p> <ul style="list-style-type: none"> • Design forms for ADDs to use in summarizing CMB&E data collected by CADC & FAs • Design collection forms for CADCs to collect community wide data & FAs to collect quantitative data • Train & assist CADCs to develop &/or collect data • Train & assist FAs to secure consistent quantitative data • Monitor progress & quality of data collection throughout the year • Summarize & analyze regional data into a national report & develop needed recommendations <p>CADCs & Other Community Committees:</p> <ul style="list-style-type: none"> • Secure CBM&E data for each site • Compare results against targets & revise as needed <p>FAs & other field extension workers:</p> <ul style="list-style-type: none"> • Assist CADCs & other community committees to secure CBM& E data • Secure quantitative data on practices for each site <p>ADDs, PVOs, PROSCARP:</p> <ul style="list-style-type: none"> • Edit & summarize CBM&E data received from CADCs & FAs in their ADD • Enter data into computer files for analysis & transmission to MAFEP for national summarization and analysis
	Setting & resetting of <u>targets</u> per site, after reviewing results/achievements - for planning (input needs) and extrapolation of results.	No. adopters biological SC and AF practices No. of farmers by practice <i>No. of trees by species</i> Area/practice Kg. seed needed/species; grass needed	April/ May	
	Both (results & target setting)	All the above data	June	
Transects at each site	Achievements per site, in addition to CBM&E.	<u>Land area</u> by practice or combination of practices No. of trees per species	April/ May	<p>MAFEP:</p> <ul style="list-style-type: none"> • Develop procedures to be followed at each site for implementing the base transect line method • Develop data collection forms for use by FAs in implementing transect • Train FAs (others) in transect procedures & monitor implementation progress • Develop forms & procedures for summarizing data at ADD & national levels <p>FAs (or others):</p> <ul style="list-style-type: none"> • Conduct transects at each site & record data on MAFEP-designed forms <p>ADDs (or other):</p> <ul style="list-style-type: none"> • Summarize site data for all sites in their domain & enter into computer files for transmission to MAFEP

*Other types of data will be collected, but are not included in the table., e.g., technology/species preference, problems and suggestions for improved adoption.

Appendix 3: Cooperation - Integration – Synergy – Leveraging of Resources

AGROFORESTRY NATIONAL TEAM (USAID MAFEP/SO2 PARTNERS & COOPERATORS)

<u>Name</u>	<u>Position</u>	<u>Name</u>	<u>Position</u>
*Alex Saka	Executive Sec./ NASC	*M. Yush	Nursery Specialist (Peace Corps)
*S.J. Nanthambwe	Nat'l Coordinator, LCRD	G.K. Siyeni	Technical Associate
*W. Trent Bunderson	Project Coordinator	G.G. Chammagomo	Technical Associate
F. Bodnar	Deputy Coordinator	A.M. Mpira	Technical Associate
*I.M. Hayes	Graduate Student LCRD	A. Chimombo	Secretary
Davie Kumwembe	Administrative Officer	P. Tsambalikagwa	Driver
		Z. Mponda	Office Assistant/Cleaner

* Funded all or in part outside USAID resources

KEY PARTNERS AND COOPERATORS (many @ multiple geographic sites)

GOM:

ADDs (8)
 Land Resources & Conservation Department (LRCD) - MOA&I
 Chitedze & Bvumbwe Agricultural Research Stations - DARTS
 Department of Agricultural Extension- MOA&I
 Department of Agricultural Research & Technical Services - MOA&I

Forestry Department
 Forestry Research Institute of Malawi – FRIM
 Bunda College of Agriculture
 Natural Resources College - MOA&I
 Land Husbandry Training Center – LRCD
 Agricultural Communications Branch – DAE

Donor-funded Projects or Activities:

Promotion of Soil Conservation and Rural Production (PROSCARP) - European Union
 Malawi Environmental Monitoring Project (MEMP) – USAID/University of Arizona (UA)
 Smallholder Agribusiness Development Project (SADP) – USAID/ACDI
 International Center for Research on Agroforestry (ICRAF)
 Rockefeller Foundation

NGO/PVO:

Canadian Physicians for Aid and Relief (CPAR)
 Christian Services Committee (CSC)
 Coordinating Unit for the Rehabilitation of the Environment (CURE)
 Evangelical Lutheran Development Program (ELDP)
 International Eye Foundation (IEF)

INTERAIDE
 Lutheran Mobile Clinic (LMC)
 Malawi Wildlife Society (MWS)
 World Vision International (WVI)
 VEZA International

Private Sector

Agricultural Research and Extension Trust (ARET)
 Tobacco Exporters Association of Malawi (TEAM)
 Roundtable of Lilongwe
 Limbe Leaf Tobacco Company
 Carlsberg Breweries

Other Partners/Cooperators:

Wye College – United Kingdom
 McGill University – Montreal, Canada
 University of Wageningen, Netherlands

Appendix 3-A: Results and Impact of Field Programs- 1997/98 Workplan

AGROFORESTRY NATIONAL TEAM (USAID MAFEP/SO2 PARTNERS & COOPERATORS)

MAFEP-USAID investments in field programs are largely limited to:

- assistance with provision of seeds (nursery establishment and plantings)
- technical training and training of trainers
- technical assistance (diagnosis troubleshooting of technical problems)
- training, assistance in M&E data collection & analysis
- assisting partners to access information, inputs and services from others (agroforestry broker)

<u>Partner</u>	<u>No. of field sites</u>	<u>No. of farmers targeted</u>
<u>NGOs:</u>		
VEZA	5	400
EDLP	9	6,000
LMC	4	200
CCAP	2	100
CPAR	2	300
WVI	2	150
CSC	18	1,800
INTERAIDE	3	400
IEF	1	400
WSM	6	1,000
Subtotal	52 sites	10,750 farmers
<u>Private Sector:</u>		
Round Table/TEAM	1	400
Limbe Leaf	1	300
Carlsberg/ACDI	6	7,500
Subtotal	8 sites	8,200 farmers
<u>GOM & Projects:</u>		
+8 ADDs	24	1,200
PROSCARP	213	50,000
Forestry Department	2	1,000
MAFE Sites	13	700
Subtotal	254 sites	52,900 farmers
Totals Workplan 1997/98	312 sites	71,850 farmers

Note: Some sites are large with multiple villages; others have only 1 small village.